NETWORK WORLD
The Newsweekly of User Networking Strategies
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IBM bolsters NetView, key SNA software

By Paul Desmond
Senior Writer

WHITE PLAINS, N.Y. — IBM last week announced enhancements to key mainframe and front-end processor software that bolster support for distributed applications and make it easier to configure links between networked devices.

IBM also unveiled NetView enhancements that let the integrated net management system monitor host-based applications by accepting alarms directly, rather than through VTAM.

IBM also announced a version of NetView that runs under MVS/ESA.

The new release of IBM's Network Control Program (NCP) front-end processor software supports dual addressing for Token-Ring Interface Couplers (TIC), which link Token-Ring local-area networks to front-end processors. The new feature allows one TIC to back up another in case of a failure and supports load balancing, thus improving throughput by giving a single network dual links to a front-end processor.

With the company's new release of NCP and a new release of VTAM for mainframes, IBM has embraced a concept dubbed "casual connections," which is intended to make it easier to con-

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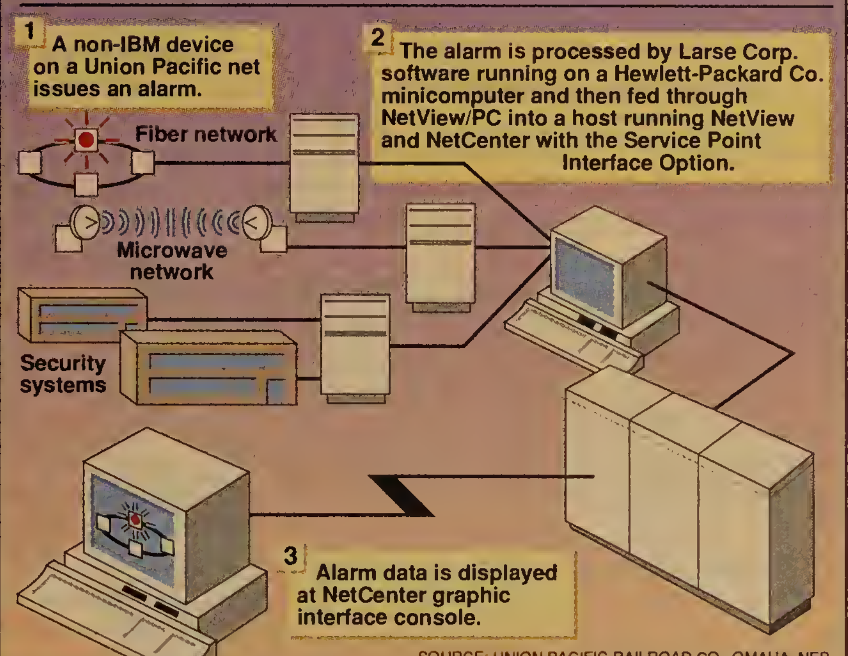
NetCenter reaches out to non-IBM devices


1 A non-IBM device on a Union Pacific net issues an alarm.
2 The alarm is processed by Larse Corp. software running on a Hewlett-Packard Co. minicomputer and then fed through NetView/PC into a host running NetView and NetCenter with the Service Point Interface Option.
Fiber network
Microwave network
Security systems
3 Alarm data is displayed at NetCenter graphic interface console.

SOURCE: UNION PACIFIC RAILROAD CO., OMAHA, NEB.
GRAPHIC BY SUSAN J. CHAMPENY

NetView user ties non-IBM devices into IBM NetCenter

Union Pacific RR monitors multivendor equipment using option for NetCenter graphical interface.

By Paul Desmond
Senior Writer

OMAHA, Neb. — Union Pacific Railroad Co. is using software that enables IBM's NetCenter graphical NetView interface to display alarms and alerts from third-party devices, a capability IBM is thinking about making generally available.

Union Pacific codeveloped the non-Systems Network Architecture interface software, dubbed the Service Point Interface (SPI) Option, with US West Network Systems, Inc. (NSI). NSI recently sold NetCenter and the marketing rights for SPI to IBM ("IBM refines NetView, closes Siemens deal," *NW*, Aug. 21).

With the SPI Option, Union Pacific can graphically display alerts coming from a network monitoring system it uses to keep tabs on devices in its nationwide network.

Union Pacific has been lobbying IBM officials to include the third-party device interface with NetCenter when it ships, said Sam Coffee, manager of net management systems for Union Pacific.

"We are hopeful IBM will an-

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Next-generation LAN Manager set to debut

Feature-rich Version 2.0 optimized for 386, 486 servers but lacks needed directory services.

By Laura DiDio
Senior Editor

FRAMINGHAM, Mass. — Microsoft Corp. and a host of its network OEMs hope to reverse the fortunes of OS/2 LAN Manager this week when they unveil a new generation of the year-old network operating system.

Alan Kessler, director of marketing for 3Com Corp.'s Distributed Systems Division, which codeveloped LAN Manager, said enhancements in Version 2.0 include a subsystem for high-performance disk I/O, support for multiprocessor servers, system fault tolerance (SFT) and improved network management.

The announcement of LAN Manager 2.0 will coincide with Compaq Computer Corp.'s official entry into the local-area network market. Compaq is expected to announce in Houston today that it will bundle the network operating system with a new line of high-performance systems it will sell as servers.

LAN Manager 2.0 has been optimized to run on servers based on Intel Corp.'s powerful 80386 and 80486 microprocessors, but it can be configured to run on 80286-based systems as well.

The increased functionality in LAN Manager 2.0 will enable users to build large enterprisewide networks that, for the first time, can be managed from a system administrator's workstation.

According to a LAN Manager OEM that has tested the product,

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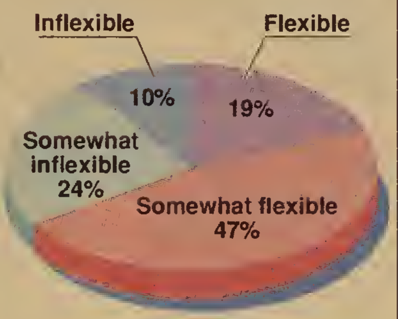
Centrex users speak

How would you rate the flexibility of your Centrex tariff?



See story, page 3.

Figures are based on a survey of 171 users.

SOURCE: NATIONAL CENTREX USERS GROUP, NOVI, MICH.
GRAPHIC BY SUSAN J. CHAMPENY

Insurer gets service edge via network

By Bob Brown
Senior Editor

CLEVELAND — Progressive Casualty Insurance Co. credits its nationwide voice/data network with slashing corporate communications costs by $4.5 million a year and enabling local agents to process 30% more claims.

While the cost savings are significant, the network's role in improving Progressive Casualty's customer service is what gives the company its strategic edge. Thanks to the net, the insurer has halved the time it takes to process a customer's claim.

"One of our strategic advantages is getting a check into the customer's hand in a very short period of time," said Dick Bradner, Progressive Casualty's manager of network services.

Overall, the network supports 220 sites, including some banks

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NETLINE

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NETWORKING IS AT THE center of Wall Street's program trading controversy. Page 2.

US WEST HOPS ON the disaster recovery services bandwagon. Page 2.

TRIED-AND-TRUE technologies take the stage at this year's Autofact show. Page 2.

K MART SIGNS ON with MCI as its largest Vnet virtual network customer. Page 3.

***NETWORK WORLD* TEAMS** with Infonetics to test and report on LAN products. Page 5.

THIS WEEK'S Buyer's Guide examines the latest in midrange test equipment. Page 45.

NEWSPAPER

FEATURE

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Wireless LANs go where cable fears to tread

By Benn Kobb
Special to Network World

A manager reconfiguring a local-area network faces costs not only in making changes to computing and communications equipment and cabling, but also in network downtime and modifications to buildings. Motorola, Inc. has estimated that between 1986 and 1990, companies will have spent a cumulative $5.6 billion to relocate devices on LANs.

Coaxial cable, twisted-pair wire and fiber optics will continue to be the dominant media used in LANs for the foreseeable future. However, where it is awkward, time-consuming or too costly to run cabling — such as between buildings or in systems that undergo frequent rearrangements — radio technology can be an effective alternative.

The use of radio waves to connect indoor computer equipment is not new. Hand-

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Wall Street looks to clamp down on network trading

Securities firms halt practice of program trading; N.Y., Chicago stock exchanges set new rules.

By Wayne Eckerson
Staff Writer

NEW YORK — Networking is at the heart of the controversy now raging on Wall Street over program trading.

Powerful computers and networks have enabled brokerages to automatically execute lightning-quick buy and sell orders for huge blocks of stocks and futures. But program trading, which has generated huge profits and accounts for roughly 14% of all trades on the New York Stock Exchange (NYSE), is being attacked by a growing number of opponents concerned about its impact on the financial world.

Last week, several leading securities firms, including Merrill Lynch & Co., Inc., announced that they had curtailed or discontinued program trading in the face of a mounting public outcry that the practice has injected an alarming degree of volatility into U.S. financial markets.

In addition, the NYSE and the Chicago Mercantile Exchange last week announced new rules that would further curb program trading during market downturns, such as the 190-point market plunge last month that triggered the current storm of protest.

Opponents, including brokers, chief executives of large U.S. corporations, large private investment firms and trading floor specialists, claim program trading accelerates swings in stock prices. They warn that these swings are scaring away small investors and eroding the

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US West ups effort to sell disaster recovery services

Recent disasters have made users willing to buy.

By Bob Brown
Senior Editor

MINNEAPOLIS — US West, Inc. is expanding an aggressive marketing campaign aimed at selling disaster recovery services to large businesses in its territory.

US West is among a growing number of regional Bell holding companies pushing disaster recovery services. Bell Atlantic Corp., for example, recently began touting its new CommGuard series of network continuity services to big users. It plans to introduce new disaster recovery services early next year.

The fire that knocked out Illinois Bell Telephone Co.'s Hinsdale, Ill., central office in May 1988, caused carriers to reevaluate the reliability of their networks and spurred them to offer disaster recovery services. In addition, Hurricane Hugo and the San Francisco earthquake have given new urgency to network and business continuation planning, the carriers said.

"The idea behind these ser-

(continued on page 82)

Attendees of Autofact '89 put MAP on back burner

By Barton Crockett
Senior Editor

DETROIT — MAP took a backseat to existing network technologies here last week, as Autofact '89 attendees focused on the use of time-proven communications tools to support computer-integrated manufacturing (CIM).

More than 20,000 people attended the event, the country's premier CIM showcase. While several vendors used the show to spotlight new Manufacturing Automation Protocol Version 3.0 products, attendees seemed more interested in learning how established technologies, such as Ethernet, Transmission Contol Protocol/Internet Protocol and token ring, could help them implement CIM.

"MAP is state-of-the-art technology in a market that's not yet ready for that," said Duane Erickson, a consultant with the Grand Rapids, Mich.-based consultancy Amprotech, Inc.

Erickson said users are shying away from MAP 3.0 implementations because of concerns that the technology is too expensive and not yet feasible to install on a broad scale.

Concerns about MAP were reflected in the show's featured exhibit, an 8,000-sq. ft. multivendor CIM demonstration dubbed "Partnership for Integration." Products from 21 vendors were featured in the exhibit, which

(continued on page 78)

Briefs

SQL vendors unite. A group of data base management system and computer vendors last week formed a consortium that will develop by next year a standard implementation of SQL, which is used to extract data from relational data bases. The SQL Access Group, headquartered in San Jose, Calif., will define a standard SQL DBMS interface, which will enable a vendor's SQL-based application running on a network workstation to access any SQL-based DBMS that supports the interface.

A videoconferencing first. Austin, Texas-based Videotelecom Corp. and Peabody, Mass.-based PictureTel Corp. last week staged the first formal interconnection of disparate videoconferencing gear using the emerging H.261 standard for compressing full-motion video for transport across public network facilities. H.261 is considered the most critical element of the CCITT Px64 standard for internetworking disparate videoconferencing systems. H.261 was used to establish a one-hour interconnection between videoconferencing systems from each vendor via a 112K bit/sec circuit from US Sprint Communications Co.

Mapping out its future. At last week's Autofact '89 show in Detroit, Tandem Computers, Inc. announced plans to offer Manufacturing Automation Protocol Version 3.0 products for its processors by the end of 1990. Tandem's MAP 3.0 software will support Manufacturing Messaging Specification and the File Transfer and Access Method running across Ethernet and broadband networks. No pricing was released, but beta tests will begin in the middle of next year, according to company executives.

MCI packages services for hotels. MCI Communications Corp. last week announced availability of MCI Hospitality Plus, a package of separately priced calling services designed specifically for the hotel industry.

The MCI Hospitality Plus program includes operator services for guest rooms, MCI 800 service, MCI Fax, pay phone services, Prism 1 and Hotel Prism — a modified version of the Prism Plus service.

Hotels will be charged the standard Prism Plus per-minute rates and monthly fee, but they can qualify for a special discount, which will apply if off-peak traffic (evening, night and weekends) equals or exceeds 60% of the total traffic volume.

AT&T Megacom 800 goes to Canada. AT&T last week said it will introduce Megacom 800 service, its high-capacity, inbound calling offering, to Canada beginning Dec. 3. AT&T Megacom 800 — Canada will allow U.S. companies to receive 800 calls from Canada.

Users will have the option of opening their 800 numbers to all of Canada or limiting access to selected Canadian area codes, AT&T said.

Megacom 800 — Canada pricing will vary depending on time of day, distance of the call and overall dollar volume of usage from Canada. Installation charges will be waived for service ordered between Dec. 3, 1989, and March 3, 1990, and installed by June 1, 1990.

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MCI signs up K mart for 3 years in largest domestic Vnet contract

Carrier will handle voice, data traffic and net management.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. is expected to announce this week that it has signed up K mart Corp., the nation's second largest retailer, as its largest Vnet customer with 3,300 locations in 50 states and Puerto Rico, *Network World* has learned.

The three-year, multimillion-dollar deal calls for MCI to carry virtually all voice traffic and about 30% of the data traffic for K mart's headquarters, distribution centers, regional offices, individual stores and its subsidiary, Waldenbooks Company, Inc. MCI will also provide billing and network management for K mart.

Installation of the Vnet network was completed in October, and K mart officials project they will save about 25% over the long-distance charges they previously paid using MCI's Dial 1 service. In addition to cost savings, K mart expects the Vnet to improve customer service and increase productivity of employees, in part because of a special dialing plan.

"Data communications and voice communications are all part of the general program not only to make the stores more efficient and customer-oriented, but to reduce the expenses of the company," said David Carlson, senior vice-president of corporate information systems at K mart.

K mart considered moving to a virtual network service about two years ago but concluded that it would not be cost-effective because switched network access was not available, according to Nancy Kornfield, manager of voice communications at K mart.

The majority of locations on the network are individual stores with low traffic volumes, she said. "The only way we could have connected to a virtual network was to install a dedicated line from our stores to the carrier's point of presence, and the cost to do that was more than what our long-distance costs were," she said.

K mart eventually decided to go with Vnet after MCI introduced switched Vnet access and prices for the service dropped to a level that made the service attractive.

Before awarding the Vnet contract to MCI, K mart reviewed a bid from AT&T, Kornfield said. However, MCI won the contract largely because it could deploy the network quickly.

"A good reason for us to lean toward MCI was that we have about 2,800 locations with MCI already, which made the implementation of the network very easy," Kornfield said. She said the installation began in June and was completed in October.

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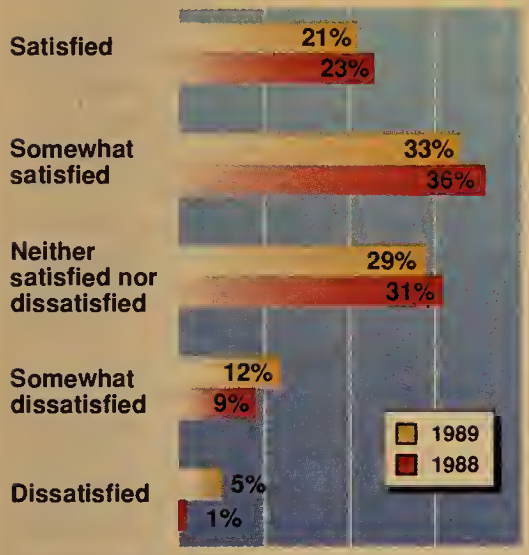
Centrex users want telcos to improve service

By Bob Wallace
Senior Editor

ATLANTA — While the majority of Centrex users are satisfied with service, a growing number of users contend that telephone companies have not made much progress improving service or adding new features, according to a survey obtained by *Network World.*

Opinions about action taken by the telephone company to resolve any Centrex dissatisfaction:



SOURCE: NATIONAL CENTREX USERS GROUP, NOVI, MICH.
GRAPHIC BY SUSAN J. CHAMPENY

The survey, conducted by the National Centrex Users Group (NCUG), which will release the results at its conference here this week, reveals that service providers have made few improvements to maintenance, customer service and training services, despite user pleas to do so.

"The National Centrex Users Group 1989 Customer Satisfaction Survey" also shows a drop in the popularity of older central office-based call distribution systems and tepid interest in Integrated Services Digital Network. The group polled 924 members and received 117 responses from around the country.

According to the survey, more than half of the respondents operate systems larger than 2,000 lines, 22% run 501- to 2,000-line Centrexes, while the remainder have systems with less than 500 lines.

Users were asked to rate action taken by their service provider to resolve Centrex "dissatisfactions." Centrex users cited

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U.K., Europe may establish ISDN users groups akin to NIU Forum

By Tom Smith
New Products Editor

LONDON — The Commission of European Communities and the U.K.'s Department of Trade and Industry (DTI) are weighing separate initiatives to establish ISDN users groups with goals similar to the North American ISDN Users' (NIU) Forum.

The commission is soliciting opinions from users on the need for an Integrated Services Digital Network users group open to people throughout Europe, according to Kurt Konig, an official with the commission in Brussels, Belgium. The group would develop application requirements, which could be turned over to a standards-making body or equipment manufacturers.

In the U.K., DTI, the functional equivalent of the U.S. Department of Commerce, this month will begin approaching major users and vendors about the prospect of forming a U.K. ISDN users group.

Organizers of both groups are open to the idea of coordinating efforts with the NIU Forum, but it is not yet clear how that will be accomplished.

Under the commission's proposal, users throughout Europe would collaborate in identifying ISDN applications, Konig said. "The primary goal would be to give users a platform to define what they want in layman's terms," he said.

"Although there are forums [here] for establishing ISDN standards, user representation is almost nonexistent," according to Clive Harris, head of ISDN applications in the Information Services Standards Division of British Telecommunications PLC.

One goal of a European users group would be to eliminate ISDN equipment and service incompatibilities — problems that also exist in the U.S., Harris said. Application development efforts in the NIU Forum have shown the need for compatibility on a worldwide basis, he added.

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PacBell applies for conditional ISDN tariff

By Bob Wallace
Senior Editor

SAN FRANCISCO — Pacific Bell last week filed a provisional Integrated Services Digital Network tariff with the California Public Utilities Commission (PUC) for three Centrex services.

The provisional tariff will allow Pacific Bell to offer ISDN to interested users until late 1991, when the tariff expires. This will provide the carrier with feedback it can use to shape a final tariff, which will be filed shortly thereafter.

If the California PUC approves the tariff, the company will begin accepting service orders for the offering in all major California metropolitan areas on Dec. 8.

"It's our intent to learn, over the next two years, what the market actually requires so when we do file the final tariff, we'll have all that experimentation and learning behind us," said Irene Evans, an ISDN project manager with Pacific Bell.

The new service, Centrex IS, will include three services based on the 2B+D Basic Rate Interface, including two 1B+D services. The second B channel of the 1B+D services will be inactive.

Centrex IS is Pacific Bell's second major attempt to sell users integrated voice/data technology. In 1985, the Bell operating company introduced Project Victoria, a proprietary ISDN-like technology that enabled a telephone line to simultaneously support two 32K bit/sec voice channels and five variable-speed data channels.

The carrier abandoned the project in November 1988 and said it would put its future efforts behind ISDN. Centrex IS is the first fruit of that effort; the service will be available in three packages.

Package A supports circuit-switched voice over a single 64K bit/sec B channel; it costs $17.50 a month, about the same price as a voice line today. The D channel will be used only for signaling.

Package B supports circuit-switched voice over a single B channel and packet-switched data at speeds up to 16K bit/sec over the D channel; it costs $26 a month. Package C, a 2B+D offering, costs $29.50 a month and can be configured to support:

- Circuit-switched voice over a single B channel, circuit-switched data over the second B channel and packet-switched data at 16K bit/sec over the D channel.
- Circuit-switched data over both B channels and packet-switched data at 16K bit/sec over the D channel.
- Circuit-switched voice or data over a single B channel, circuit-switched data over the second B channel and packet-switched data at 16K bit/sec over the D channel.

The Centrex IS prices "are about 6% to 7% below those announced by Illinois Bell [Telephone Co.]," said Steve Sazegari, senior industry analyst with Dataquest, Inc., a San Jose, Calif.-based consultancy. "The BOCs have realized they have to offer ISDN pricing that is comparable with that of existing services." Illinois Bell filed the nation's first ISDN tariff in April 1988.

Pacific Bell's new 1B+D services will enable the company to attract a wider customer base. "Making 1B+D service available will allow us to reduce the start-up cost of ISDN for prospective customers,"

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NW *to feature LAN test series*

FRAMINGHAM, Mass. — *Network World* announced last week that, beginning in January, it will publish a series of articles detailing the results of in-depth local-area network product tests.

The LAN hardware and software tests will be conducted for *Network World* by Infonetics, Inc. of Santa Clara, Calif., a leading independent test laboratory and research organization.

The *Network World*/Infonetics LAN Test Series, which will appear each month, will focus on a variety of important LAN issues.

The series is scheduled to begin in the Jan. 22 issue with a complete evaluation of 4M and 16M bit/sec token-ring LAN performance.

Tests conducted in the Infonetics laboratory will simulate real-life business network conditions.

The articles will offer readers detailed evaluations of the latest LAN technologies and will assess the interoperability of many different types of LAN hardware and software.

"Working with Infonetics on these tests will enable us to give our readers the practical, hands-on product information they've been asking for," according to Steve Moore, *Network World* features editor.

Founded in 1985, Infonetics provides marketing consulting, market research and product testing, specializing in distributed network systems. ◪

Tests will simulate real-life business net conditions.

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***Network World*'s Gary Beach and Infonetics' Bill Coibion.**

3Com unwraps network control, 10BaseT tools

By Susan Breidenbach
West Coast Bureau Chief

SAN JOSE, Calif. — Even as the price of 3Com Corp.'s stock threatened to drop into single digits, company executives were upbeat as they hosted more than a thousand users, resellers and third-party developers at the second annual 3Com Network Systems Forum here last week.

In addition to showcasing 3+Open, 3Com used the forum to unveil a new network management system and roll out a line of products based on the 10BaseT standard for running Ethernet over standard telephone cable.

Key 3Com executives also engaged in some good-natured self-examination as they fielded some tough — although apparently rehearsed — questions from former Novell executive Craig Burton as hundreds of conference attendees looked on.

In light of sluggish 3+Open sales, Eric Benhamou, vice-president and general manager of 3Com's Distributed Systems Division, insisted that he and his colleagues were not just putting on a brave face. He said 3+Open sales have picked up in recent weeks since Version 1.1 became available and LAN Manager applications have started to emerge.

At the first Network Systems Forum a year ago, 3+Open LAN Manager 1.0 was newly released and applications were all but nonexistent. This year, there were tools such as Saros Corp.'s FileShare and Channel Computing, Inc.'s Forest & Trees on display that had been used to build sophisticated applications for accessing data stored in the Microsoft Corp./Ashton-Tate Corp. SQL Server.

"The applications really make a difference this year," said Robert Guaraldi, president of Valinor, Inc. of Westford, Mass., one of 3Com's largest independent value-added resellers. "People can now come here to see what they can do with nets, not just how to connect computers."

Stephen Sax, director of MIS for the California Trucking Association, said, "This has served to validate our decision to move away from mainframes and toward client/server computing."

While the emerging applications are impressive, they will run on any version of LAN Manager. 3Com has the most visible

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We Put The Future Of V.32 Modems On The Desktop.

Photograph: The Bettman Archive.

H.G. Wells, English author and futurist, 1866-1946. Author of *The Time Machine, War of the Worlds,* and *Things To Come,* Wells is considered one of the founding fathers of the science fiction genre.

In his science fiction novels, H.G. Wells chronicled his remarkably accurate vision of the future. Racal-Vadic's insight into the future of desktop dial-up communications is far from fiction—it's here, now.

The new 9632VP is the first modem to offer the performance of V.32 in a package tailored specifically for use with corporate PCs. So it has all the dial-up features you need, the ease of use you want, plus a tiny footprint and a price tag to match.

The 9632VP offers error correction (MNP™ classes 2-4) for absolute data integrity. And gives you data compression (MNP class 5) for throughput to 19.2 Kbps. It also features async/sync data handling for application flexibility.

Best of all, the 9632VP communicates freely with your existing modems. It's compatible with all other V.32 modems, and automatically negotiates with CCITT V.22*bis*, V.22, and Bell 212A/103 standards as needed.

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See the FAXNeT Form on Page #58

Trusthouse Forte Hotels sleep easier since AT&T Computers checked in.

Left to right:
Jerry Trapp
AT&T Data Sales Executive

Mike Otten
Vice President Sales
Encore Systems, Inc.

Bill Hanke
Executive Vice President
Marketing & Sales, Trusthouse Forte

San Diego, California
April 27, 1989

Trusthouse Forte needed to automate its reservations and property management system so it could manage its properties more efficiently and improve customer service. AT&T and AT&T Authorized Value-Added Reseller, Encore® Systems, Inc., created a solution for over 500 hotels by integrating the reservation system with a property management system. AT&T's Jerry Trapp and Encore's Mike Otten join Trusthouse Forte's Bill Hanley to retell the story.

Bill: Dated. That's how I would describe our old reservation and guest billing systems. They just couldn't reserve rooms or bill our guests fast enough. On top of that, some hotels were manually booking rooms while others were running a smorgasbord of property management software packages.

Jerry: Because nothing was plugged into your central reservations system. Your guests were not getting the service they deserved. And it was driving your hotel managers nuts as well.

Bill: And when your customers don't get service, that's when you lose their business. You can see why I needed a lodging expert like AT&T, who understood my business well enough to customize a bulletproof solution to it. Who could seriously integrate software and hardware without trashing the huge investment I'd already made in my current system.

Jerry: You needed to turn the dated system into something you could really use. Fortunately, AT&T has solved a number of problems like yours in the lodging industry. And we chose to team up with another lodging pro like Encore Systems, Inc. Together we could really zero in on your special software demands.

Mike: That's right. We knew right off that you needed a lot of flexibility built into the system. For example, it had to be able to be used at any size hotel—from 40 rooms to 400.

Bill: Which is critical. We want the smaller hotels to get as much out of it as the large hotels. And they are. Now our hotels have the ability to create guest profiles. Plus customer billings from restaurant to phone to movie charges are all automated. Now our managers can spend more time on their most important job—keeping our guests happy.

Jerry: Another nice advantage is that they can, in seconds, interactively reserve rooms all over the world. And then monitor and report results back to headquarters. So headquarters, in turn, can use that data intelligently for designing future marketing programs.

Mike: The quality of service you're giving your guests is soaring.

Bill: You said it, Mike. In fact, we've heard good things from the hotels that have the system rolling. Service standards are better and reservations are made in a flash. And satisfied guests are what we want most in this business.

The Trusthouse Forte Computer Solution:

THE CHALLENGE:

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AT&T
Computer Systems

Standards groups join forces to set specs for open systems testing

OSF, Unix Int'l, X/Open seek to eliminate duplication of effort.

By Tom Smith
New Products Editor

NEW YORK — The Open Software Foundation (OSF), Unix International, Inc. and X/Open Co., Ltd. announced last week they will develop a specification for development of open systems testing tools.

The specification could be used to develop testing tools that evaluate a range of open systems products, including network equipment, operating system software and other gear.

By collaborating to develop a single conformance testing specification, the three groups said they hope to eliminate duplication of efforts in developing conformance tests for specifications such as X/Open's Portable Operating System Interface (POSIX).

The document will include a common interface specifying how developers should write conformance test suites. It will also provide a common user interface dictating how testing options can be presented to the user performing the test, how the user would select different test procedures and how the user would be informed of the test results.

The groups also intend to make the specification capable of supporting multiple sets of testing configurations, such as X/Open's VSX, a program for evaluating POSIX conformance, as well as others.

Rather than develop its own conformance technology, OSF decided X/Open's VSX was the best technology on the market.

However, OSF said VSX needed minor modifications, such as the ability to test graphical devices such as the Motif interface developed by OSF for its operating system. The three organizations agreed

(continued on page 79)

Unix System V.4 hits market with key net features

By Paul Desmond
Senior Writer

NEW YORK — Unix International, Inc. and AT&T's Unix Software Operation last week announced the availability of Unix System V, Release 4, which merges features from several popular Unix versions and promises an easy migration from those versions.

The new Unix version is based on features — including many key networking components — from AT&T's Unix System V, Release 3, Berkeley Software Distribution 4.2 and 4.3 releases, Microsoft Corp.'s Xenix and Sun Microsystems, Inc.'s SunOS.

The new version makes it easier for users to exchange files with other Unix systems and build and support distributed, protocol-independent applications.

Among the features extracted from previous Unix versions are Sun's Network File System (NFS) and Remote Procedure Call (RPC), said Art Sabsevitz, Unix systems engineering supervisor for AT&T's Unix Software Operation.

RPC builds a client/server model into Unix so networking functions associated with transporting data between the client and server are built into the operating system, rather than into an application, according to Sabsevitz.

Thus programmers are not burdened with the task of writing those functions into applications, he said.

NFS, meanwhile, provides a subset of file access methods that are common to many operating systems so an application can request files stored on various processors, regardless of the operating system. NFS is implemented on top of the RPC mechanism in the new Unix version and complements AT&T's Remote File System (RFS), which debuted in Unix System V, Release 3. RFS provides transparent file sharing across System V processors.

Support for both NFS and RFS means users can share files with machines running any Unix version that supports either scheme, Sabsevitz said.

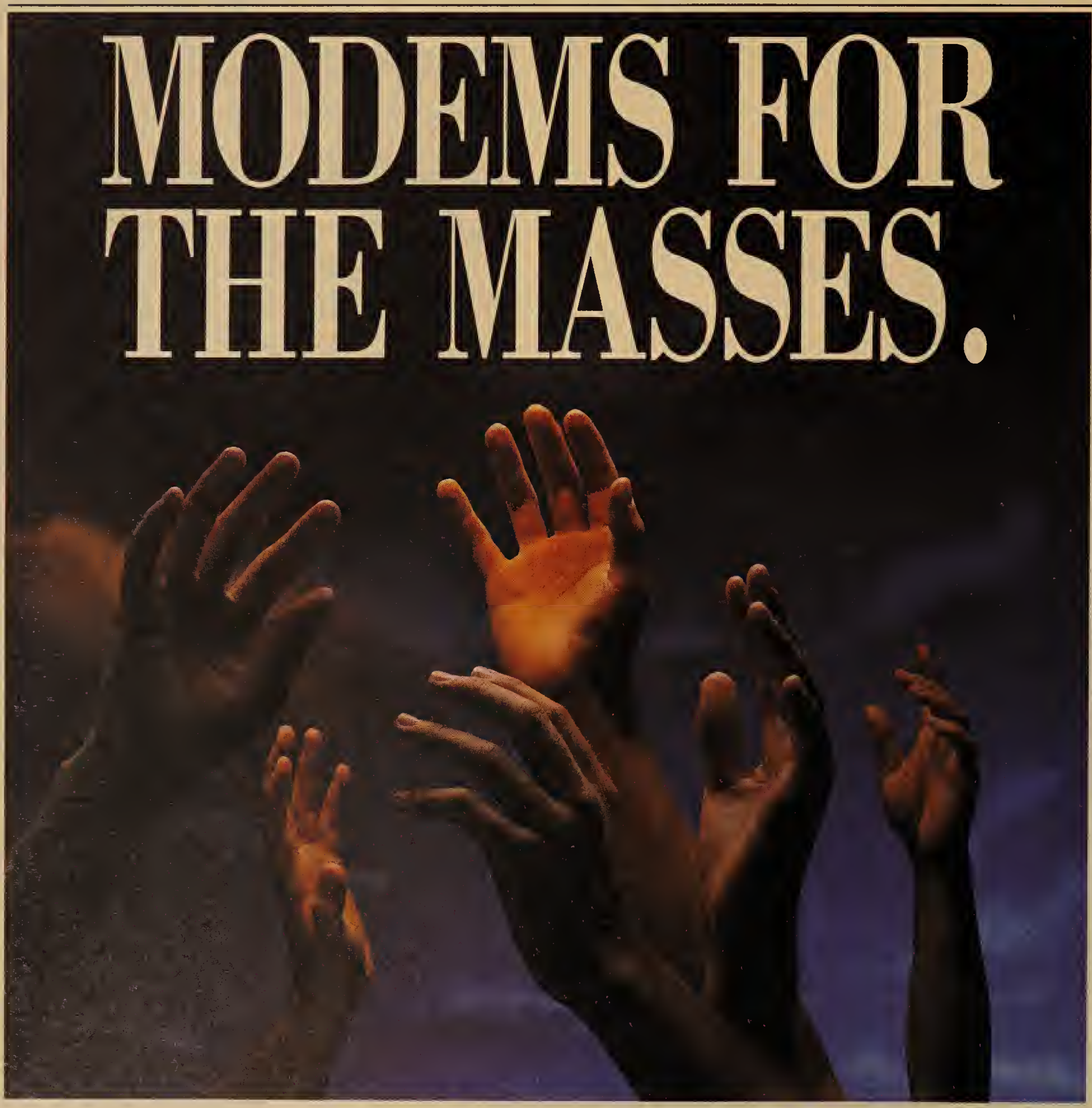
Berkeley's TCP/IP included

Also included in System V, Release 4 is a full Transmission Control Protocol/Internet Protocol suite taken from Berkeley Unix that lets Unix-based processors support applications built for TCP/IP nets, Sabsevitz said. Version 4 marks the first time TCP/IP was built into the Unix source code as opposed to being added later by vendors, he said.

Version 4 implements TCP/IP as Streams modules, which were introduced with Version 3. Streams is a framework that provides for the separation of protocols from the underlying media and hardware by providing common interfaces to the protocol.

The application interface to the Streams modules is called the Transport Level Interface (TLI), Sabsevitz said. The same application can use multiple transport protocols by writing the application to make calls to TLI instead of specifying a particular transport protocol within the application.

Unix System V, Release 4 source code costs $100,000, and various sublicense packages are available. ◼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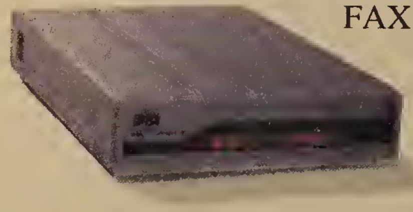

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

> "Among U.S. firms analyzed, Codex [Corp.], Racal-Milgo and Northern Telecom offer the most balanced and complete strategy to be successful in the [European] market of 1992."
>
> **Pierre Jungling**
> Analyst
> International Data Corp.
> Framingham, Mass.

People & Positions

Jo Anne Miller last week was named vice-president of technology at **Unix International, Inc.**, a Parsippany, N.J.-based organization directing the future development of Unix System V.

Miller is responsible for guiding the technological and product evolution of Unix System V. She will work with the Unix International Steering Committee, work groups, AT&T's Unix Software Operation and other organizations to ensure that products supporting Unix System V get to the market quickly.

Miller replaces Alan Nemeth, who — as previously planned — resumes his responsibilities at Prime Computer, Inc.

Previously, Miller was with Chicago-based Shields' Enterprise, Inc.

Andy Schopick was recently named vice-president for new business development at **New Science Associates, Inc.**, a Southport, Conn.-based consulting and market research firm.

Until recently, Schopick monitored the network industry as a vice-president and senior analyst at SoundView Financial Group, Inc., a Stamford, Conn.-based market research and consulting company.

Schopick's responsibilities will include starting up a service to track advanced network computing technologies and companies. ◘

Broadband vendors changing user focus

Faced with a fading broadband market, vendors diversify product lines and search for new takers.

By Bob Brown
Senior Editor

As traditional markets for broadband local-area networks are drying up, vendors are pitching their wares to new industries and broadening their product lines to include more popular Ethernet and token-ring tools.

Broadband vendors traditionally sold the bulk of their products to manufacturers, universities and military users. But many of those users have either already invested in broadband or are leaning toward newer, more attractive options such as fiber-optic or token-ring LANs.

Consequently, broadband vendors are trying to find new takers for the technology, especially in the financial and health care industries.

Broadband is especially useful in those sectors, vendors claim, because the technology concurrently supports voice, data, image and video traffic over different channels on a coaxial cable.

Broadband also provides network security, and it can be used as a network backbone.

"Broadband is still far and away one of the most cost-effective backbone solutions on the market," said Bill Hipp, director of marketing for Hughes LAN Systems, Inc. "Other than the automotive industry, it has not received a lot of favor, but when you compare [it with other solutions] on a cost per node basis for installation and use, I believe broadband is [the] cheapest."

Although broadband suppliers are optimistic that new markets will open up, they are also hedging their bets by broadening product lines to include popular products that support Ethernet and token-ring technology.

Many vendors are also selling products that enable existing broadband users to tie their nets to other types of networks.

Broadband's the cure

Applitek Corp., an Andover, Mass.-based broadband LAN vendor, is working with several hospitals to set up broadband backbones to support not only cable television, but also data transmission from payroll to accounting and X-ray transmission.

Hospitals make ideal broadband users because they already have made sizable investments in coaxial cable to provide cable television to patients' rooms, said Rouzbeh Yassini-Fard, vice-

(continued on page 11)

INDUSTRY BRIEFS

Sam Ginn, chairman and chief executive officer of **Pacific Telesis Group** in San Francisco, last week told industry analysts that the company sustained $45 million to $50 million in damage to its buildings and network facilities as a result of the recent San Francisco earthquake. The network, however, stayed up during the crisis, he said.

Ginn said most of the damage would be covered by a $150 million earthquake insurance policy. Fourth-quarter earnings are not expected to be negatively affected by costs incurred due to the repairs because revenue from increased calling following the quake will offset those costs, he said. Pacific Telesis, which plans to reduce its rates under a new regulatory plan from the California Public Utilities Commission, does not expect to have a strong earnings year in 1990, Ginn said. But, he added, the new regulatory framework promises to let the firm increase earnings in the future by improving operating efficiency.

Metromedia Co. in New York last week announced that it has renamed its long-distance unit **Metromedia-ITT Long Distance.** Metromedia decided to rename the unit in the aftermath of its acquisition in late August of ITT Communications Services, Inc. and ITT Chernow Communications, Inc. from ITT Corp. The unit also includes Metromedia Long Distance, which serves users in Florida, New Jersey, New York, Texas, Philadelphia and Washington, D.C. Metromedia claims to be the nation's fifth-largest long-distance carrier, with projected 1989 revenue of $550 million. ◘

Mainframe matchup

digital	TANDEM
Mainframe offering:	**Mainframe offering:**
■ VAX 9000	■ NonStop Cyclone
Introduced:	**Introduced:**
■ Oct. 24	■ Oct. 16
Sampling of communications features:	**Sampling of communications features:**
■ Acts as a high-end server managing access to a centralized data base.	■ On-line, query and batch processing of large data base applications.
■ Attaches to DECnet via DEC Lancontroller 400 Ethernet adapter.	■ May be attached to a network of Tandem computers running the Guardian operating system for distributed processing.
	■ Supports connection to Access/One local network.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCES: DIGITAL EQUIPMENT CORP., MAYNARD, MASS., AND TANDEM COMPUTERS, INC., CUPERTINO, CALIF.

DEC, Tandem count on new mainframes to expand nets

Mainframe sale seen as key to account control.

By Gail Runnoe
Washington Correspondent

Digital Equipment Corp. and Tandem Computers, Inc. are counting on recent mainframe introductions to spur sales of networking equipment and tighten their grip on large accounts.

Both companies say that by providing users with high-end computers, they should be able to compete for accounts that had been closed to them in the past. The sale of a mainframe into a customer site is also likely to result in follow-up sales for other equipment and the network links to tie it all together.

Peter Ross, manager of DEC's new VAX 9000 mainframe — which is up to 4½ times more powerful than the VAX 6000 — said the new high-end system would create leverage for DEC.

With the VAX 9000, "we are in a better position to address high-end needs," he said. "This will have a spin-off benefit across all areas of the company. We'll be selling more workstations, disks, services and DECnet products."

Ross said the introduction of a mainframe with data base capabilities is key to DEC's efforts to establish DECnet as a corporate network, and not just in isolated departmental settings.

"If you can own the data base, that proliferates down the entire organization," Ross said. "One is inclined to pick network products that can access that data base. What is better to access data on a VAX than another VAX?"

Ross added that it is also more cost-effective and faster to distribute applications out to network locations if there is only one architecture across the firm. "It's cleanest from the implementation point of view," he said.

DEC may even see DECnet sales pick up soon because some users planning to install a VAX 9000 may implement DECnet now in order to have the underlying network architecture for the mainframe to fit into later.

"As people see the VAX 9000 as a potential growth path, purchases of network equipment could accelerate. [Users] will be prepared to invest in DEC network products knowing they can grow into the VAX 9000," Ross said.

Riding the coattails

Likewise, Tandem expects that its new line of mainframes, the NonStop Cyclone, could help spur sales of its connectivity products and local-area network offerings from its Ungermann-Bass, Inc. subsidiary.

> "If you can own the data base, that proliferates down the entire organization."
>
> ▲▲▲

The NonStop Cyclone comes configured with as many as 16 processors and is designed for use in on-line transaction processing environments; it is expected to compete primarily against IBM's 3090 mainframe.

The Cyclone is an extension of Tandem's strategy to provide computers that enable users to create real-time data bases. Tandem wants to connect workstations into that data base for on-line queries and share information across a network using common protocols such as Sys-

(continued on page 11)

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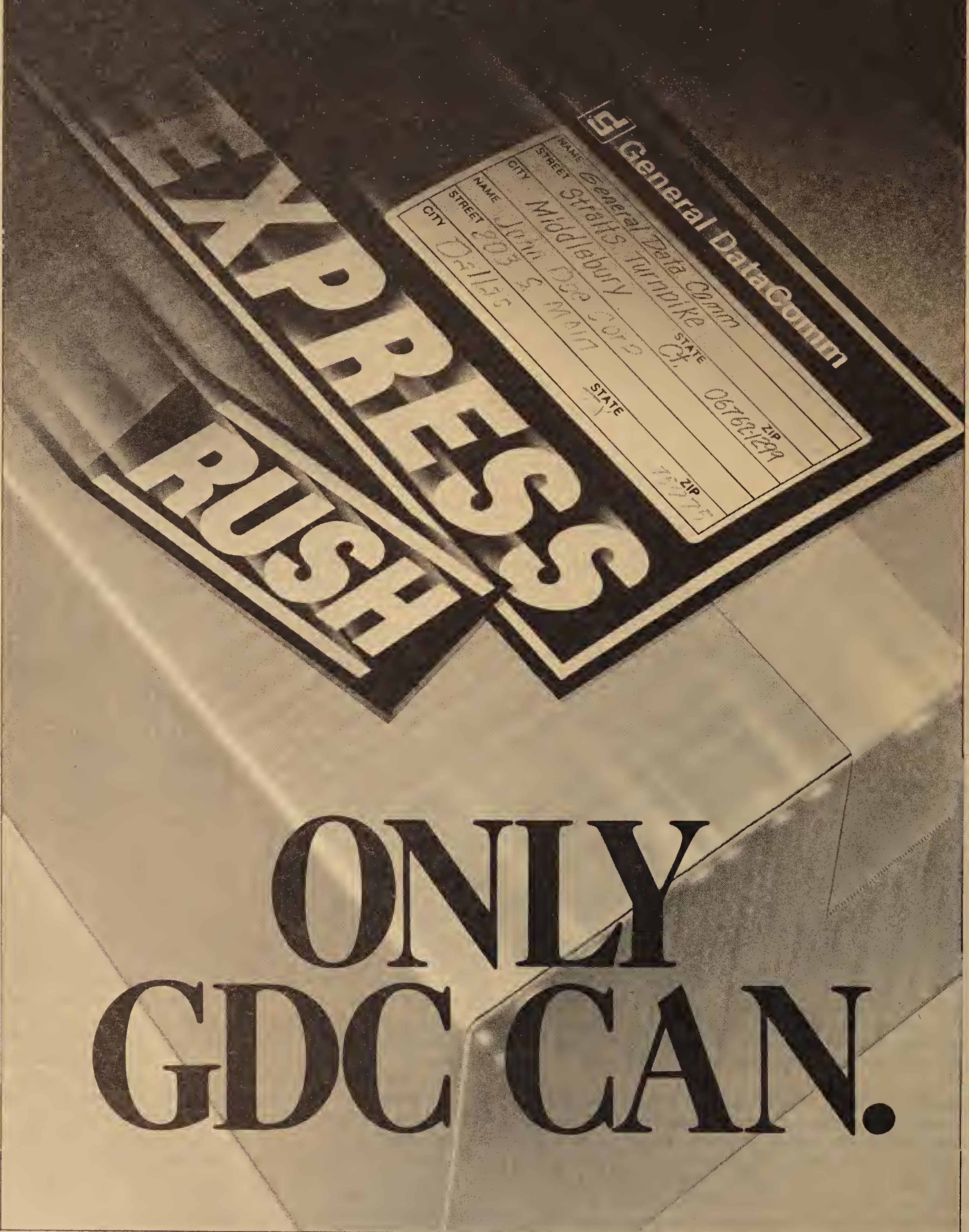

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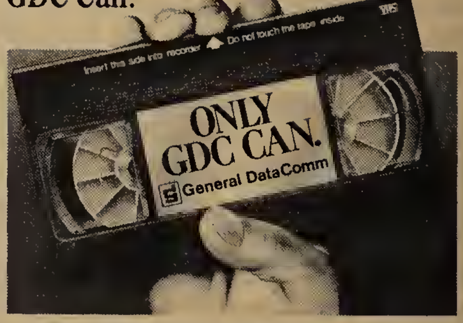

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General DataComm

Broadband vendors changing user focus

continued from page 9

president of sales and marketing at Applitek.

He said hospitals can tap into the largely unused bandwidth on those networks to transmit other data, instead of laying out considerable sums of money for a separate wiring system for another LAN.

Applitek is so sure new markets will drive demand for broadband nets that later this month, it plans to roll out products supporting connection of broadband LANs to X.25, Systems Network Architecture and Transmission Control Protocol/Internet Protocol nets, Yassini-Fard said.

In recent years, broadband nets have become technologically sophisticated and vendors have turned to promoting them as a backbone network rather than as a means to connect desktop workstations, which can be expensive, he said.

"Most users who are down on broadband tried it back in the '60s and '70s and got burned," Yassini-Fard said. "It's time to give it another chance."

Banking on broadband

Hughes LAN Systems, which was formed after Hughes Aircraft Co. bought Sytek, Inc. earlier this year, sells its broadband products in the U.S. mainly to traditional broadband customers. But the company has succeeded abroad in selling broadband to many nontraditional users, particularly banks, Hipp said.

In West Germany, for example, Hughes LAN Systems has sold broadband products to several banks via a reseller agreement with Nixdorf Computer AG, which has a large banking clientele.

Banks are turning to broadband, in part, to satisfy a growing need to transmit financial document images over their networks, Hipp said.

Fallback position

Ungermann-Bass, Inc., a longtime broadband supplier, considers itself "a media-independent" company, said Bill Bailey, the Santa Clara, Calif.-based firm's media product manager. Its strategy is not to push any media in particular, but to supply whatever type of media the user wants, he said.

As of late, not too many users have been asking for broadband, he said.

"Broadband has been pretty flat for us," Bailey said. "At one time, we sold the majority of our equipment in broadband configurations, but new broadband installations have been falling off."

Users are turning to newer technologies, such as fiber, or other options, such as Ethernet, which have come down in price in recent years, Bailey said. Unless users have a strong video requirement, broadband is probably not the right media choice, Bailey said. "We had hoped video would drive the market stronger than it has," he said.

Still, Ungermann-Bass has not given up on broadband, Bailey said. In fact, the company last month introduced offerings for its Access/One wiring concentrator to provide access between broadband nets and other networks ("UB launches its Access/One additions to enhance line," *NW*, Oct. 23).

Hughes LAN Systems has also diversified into other technologies to augment its broadband strategy, Hipp said. "We've branched away from broadband into token ring, Ethernet and fiber optics," he said.

While most vendors agreed that sales of broadband nets are flat, the need to communicate between existing broadband nets and other types of networks is growing, said Gail James, president of LanQuest Group, Inc., a San Jose, Calif.-based consulting firm. "Bridges, routers and gateways are where most of the growth and activity is in broadband today," he said. "Users don't want to be isolated." ◘

DEC, Tandem count on new mainframes

continued from page 9

tems Network Architecture, Open Systems Interconnection and Transmission Control Protocol/Internet Protocol.

"The [NonStop] Cyclone enables users to create a larger transaction processing data base than ever before achievable, which can then be used in a network to share information with more users," said Steve Saltwick, marketing programs manager for networking products at Tandem. He said NonStop Cyclone buyers will turn to Tandem and Ungermann-Bass for network links because those companies can provide links that are optimized for the new mainframe and because customers want a small number of vendors.

Positive thinking

Bart Stuck, president of Business Strategies, a Westport, Conn., consulting firm, said the mainframe announcements are very positive for DEC and Tandem.

"Until now," he said, "users had to go to the mainframe for the data and the applications. Now the applications can be moved around much more easily on the network" and can reside on a local personal computer or server.

"People can download the data they need to a local server and then send it back to the mainframe at the end of the day," he said. This saves time over having to go through a mainframe, where users could encounter communications delays. This approach will stimulate revenue for both companies because salespeople will have more [options] to offer," Stuck said.

Richard Villars, senior LAN analyst at International Data Corp. in Framingham, Mass., said that by expanding the processor base, DEC has expanded the size of the environments it is able to support.

"A mainframe will get them into sites they were not considered for in the past," he said. ◘

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Worth Noting

> "The question was not should there be ISDN, but rather, should we in the U.S. ignore ISDN while other countries are clearly on their way to implementation."
>
> **Eli Noam**
> Commissioner
> New York Public
> Service Commission

Carrier Watch

AT&T recently announced a reliability warranty program that provides users of its 45M bit/sec Accunet T45 Service with credits for service interruptions.

Under the Accunet T45 Service Assurance Warranty, AT&T will credit up to 100% of a month's price for each Accunet T45 Service circuit that experiences outages.

The warranty covers all service interruptions reported to AT&T, regardless of duration, on the entire AT&T-provided or -billed portion of the circuit.

The carrier will calculate credits independently for each outage.

Total credits for each circuit per month will depend on the number of times the service is interrupted and the length of each outage.

Credits begin at 5% for an outage of 59 minutes or less, while an interruption longer than nine hours will receive the maximum credit per single outage of 50%.

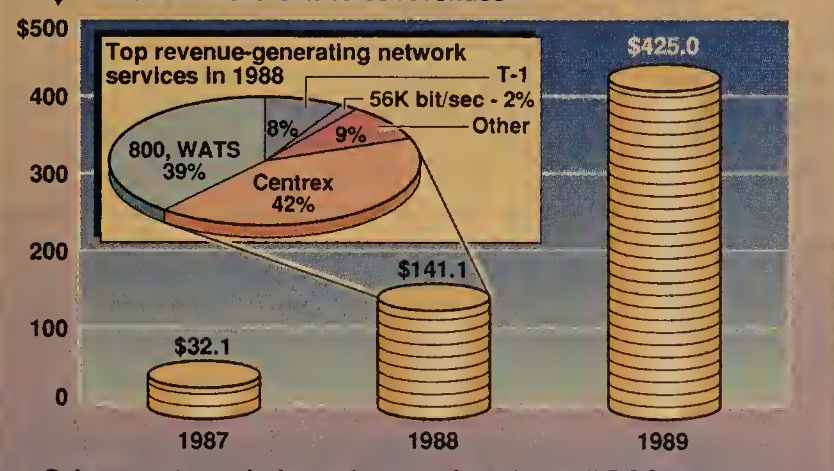
Under the warranty, a company that sustains two outages longer than nine hours in duration on the same circuit would receive a 100% credit for the monthly cost of the circuit, according to an AT&T spokeswoman.

Introduced in November 1985, Accunet T45 Service is now available in 155 U.S. cities.

The Accunet T45 Service Assurance Warranty is scheduled to take effect Nov. 10. ◘

BOC sales agents' revenues climb

▼ Millions of dollars in sales revenues



Sales agents are independent vendors that sell BOC network services on a commission basis.

SOURCE: NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

BOC sales agency programs hit stride after rocky start

Agents are new revenue source for local telcos.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — Independent sales agencies will generate $425 million in revenue for the Bell operating companies this year and will receive $65 million in commissions, according to a recent report by the North American Telecommunications Association (NATA).

The report, "Sales Agency: A Comparative Analysis," concluded that sales agency programs are "enjoying a period of dynamic growth" and are one of the keys to future competition.

The 1989 numbers are up substantially from figures for the year before. In 1988, independent vendors participating in sales agency programs generated roughly $141 million in revenues for BOCs by selling voice and data services, and they earned $22.2 million in commissions (see graphic, this page).

The marked increase in revenue attests to the success of the programs, according to Mary Bradshaw, coauthor of the report and industry relations director for NATA. NATA is a trade group representing 700 equipment manufacturers, distributors, suppliers and carriers.

"The program has helped voice [equipment] vendors generate revenue in new areas like network services and data communications equipment," Bradshaw said.

The sales agency idea was created in 1984 when the Federal Communications Commission issued an order saying the BOCs had to establish agency programs if they wanted to pay their equipment subsidiaries commissions for selling services.

The ruling said agent programs should provide third parties with "meaningful opportunities" to sell Centrex and other network services, according to Bradshaw. Centrex is the only service that all BOCs have since authorized agents to sell. Many of the agents are also authorized to sell 800, WATS, T-1 and 56K bit/sec digital data services.

Sales agency programs enable the BOCs to extend the reach of their sales forces and give customers the option of buying equipment and network services from another channel, according to NATA.

In 1985, the FCC ordered BOCs with deficient sales agency programs — those generating little revenue — to sign up agents and put vendors on a more equal footing with the BOCs' equipment sales subsidiaries, NATA said.

> Centrex is the only service that all BOCs have since authorized agents to sell.
>
> ▲▲▲

Two years later, the FCC made the sales agency program a competitive safeguard when it let the BOCs eliminate their separate subsidiaries for equipment sales and begin joint marketing of equipment and network services.

Earlier this year, in a federal court of appeals, NATA won a fight with Pacific Telesis Group, which tried to overturn the FCC order making sales agency programs mandatory, the study said.

The sales agency study was based on questionnaires mailed

(continued on page 15)

MCI spearheads ANI developers' confab

Carrier calls for users and vendors to take the initiative and build strategic ANI applications.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. officials urged users and voice processing vendors at a symposium it sponsored here to start thinking of ways to get ahead of competitors by using automatic number identification (ANI).

The symposium, which MCI called an ANI developers' conference, was intended to encourage users and vendors to work with the carrier to develop industry-specific applications that take advantage of ANI. The company also announced it is setting up a bulletin board that people can use to share ideas with MCI about the uses of ANI.

Addressing the need for active involvement in ANI application development, William McGowan, chairman and chief executive officer of MCI, told the group, "The meek may inherit the earth, but they certainly aren't going to increase market share in the meantime."

Users and vendors speaking at the symposium agreed that corporations have to start developing applications for ANI because of the technology's potential for significantly streamlining and reducing the cost of customer service and telemarketing activities.

With ANI, the telephone number of the caller is delivered to the called party. The availability of this information offers a slew of new call processing capabilities, including the ability to identify the caller and pull up customer records before greeting the caller.

For example, speakers said that ANI could cut the length of calls by 15 seconds, reducing service costs and improving customer responsiveness.

Although ANI is widely discussed as a capability of Integrated Services Digital Network, MCI will not offer ISDN services commercially until mid-1990, but it is supporting ANI in its MCI 800 Enhanced Services Package (ESP). MCI supports ANI through inband signaling in the ESP offering and will add ANI capabilities delivered through out-of-band signal-

(continued on page 15)

WASHINGTON UPDATE

BY ANITA TAFF

MCI takes another swipe at Tariff 12. MCI Communications Corp. continued its battle against AT&T's Tariff 12 last week when it asked the Federal Communications Commission to investigate the lawfulness of the carrier's latest offers to James River Corp. and National Semiconductor Corp. Although the FCC recently reaffirmed its decision allowing AT&T to offer custom network packages, MCI raised many of the same complaints it did about earlier Tariff 12 deals.

MCI labeled Tariff 12 as nothing more than "a sham that allows AT&T to discriminate unreasonably by providing varying price preferences to certain customers of its standard service offerings." MCI claimed that Tariff 12 benefits only a select groups of users — those considering moving to a competitor.

Another point raised repeatedly by MCI is that each Tariff 12 deal is designed for a single customer. In its order allowing AT&T to proceed with Tariff 12, the FCC said AT&T could not limit each Tariff 12 filing to a single customer. Although AT&T has said it will use the Tariff 12 offers filed to date to cover other customers that commit to the same terms and conditions, the 20 deals available so far are all customer-specific.

MCI charged that it is unlikely anyone will ever buy a net customized for someone else. "To suggest that others would take the same service and identical locations under the same terms, including price, is utter nonsense," MCI said in its filing.

In addition to the tariff pages filed with the FCC for each Tariff 12 deal, AT&T signs a contract with each customer. MCI has maintained that AT&T hides substantial provisions in those contracts, such as allowing collocation of equipment or pro-

(continued on page 14)

Debate over MFJ manufacturing restrictions continues unabated

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Attorneys for the RBHCs, AT&T and the Department of Justice continued their dispute over the manufacturing restrictions in the Modified Final Judgment at a recent hearing of the U.S. District Court of Appeals.

While the Modified Final Judgment clearly prohibits the regional Bell holding companies from fabricating telecommunications equipment, this debate focused on whether software production and design and development efforts should be considered part of manufacturing.

In December 1987, U.S. District Court Judge Harold Greene ruled that in the context of the Modified Final Judgment, the term "manufacturing" goes beyond fabrication and includes design and development efforts. He also said RBHC development of software products is prohibited.

At the hearing last week, Frank Cicero, an attorney for the seven RBHCs, said the Greene order "does not square with the meaning of the word" manufacturing and is "at odds with normal usage."

The RBHCs say they need to be able to manufacture equipment so they can quickly and efficiently upgrade networks and eventually bring new services to market.

Opponents of loosening the manufacturing restriction, on the other hand, claim the RBHCs would cross-subsidize their manufacturing operations with money from regulated local services. They also say the RBHCs could drive out competition by buying exclusively from themselves or subsidizing their manufacturing operations by buying from themselves at inflated prices.

In answer to those critics, Cicero suggested that the RBHCs at least be allowed to assist external manufacturers in product design and development. This would eliminate any financial gain a manufacturer could acquire by charging the RBHC an inflated price. "Absent vertical integration, the benefit does not come back to the parent company," he said.

But U.S. Circuit Court Judge Harry Edwards, one of three judges hearing the case, contended that allowing an RBHC to help an outside manufacturer with research and development could lead to anticompetitive activities. RBHCs could still drive out competition by relying exclusively on a single supplier.

David Carpenter, an attorney for AT&T, which opposes RBHC manufacturing, said that if the RBHCs set up unregulated R&D subsidiaries and contracted out manufacturing, they could sell the finished product to the parent company at an inflated price, knowing the RBHC could recoup the costs through the rate base.

On the issue of whether software should be included in the Modified Final Judgment manufacturing restriction, Cicero contended that software development should not be considered manufacturing. "Software is written; it is developed. No one describes it as being manufactured," he said.

But AT&T's attorney disagreed. "If something is a telecommunications product, the RBHCs can't design and develop the product [according to the Modified Final Judgment, regardless of] whether it's made out of software, firmware or Tupperware," Carpenter said.

Adoption of the Justice Department recommendation that RBHCs be allowed to develop software could be the first step in undermining the manufacturing ban. "This would create an exception that would just about swallow the rule," Carpenter said. ☐

Washington Update

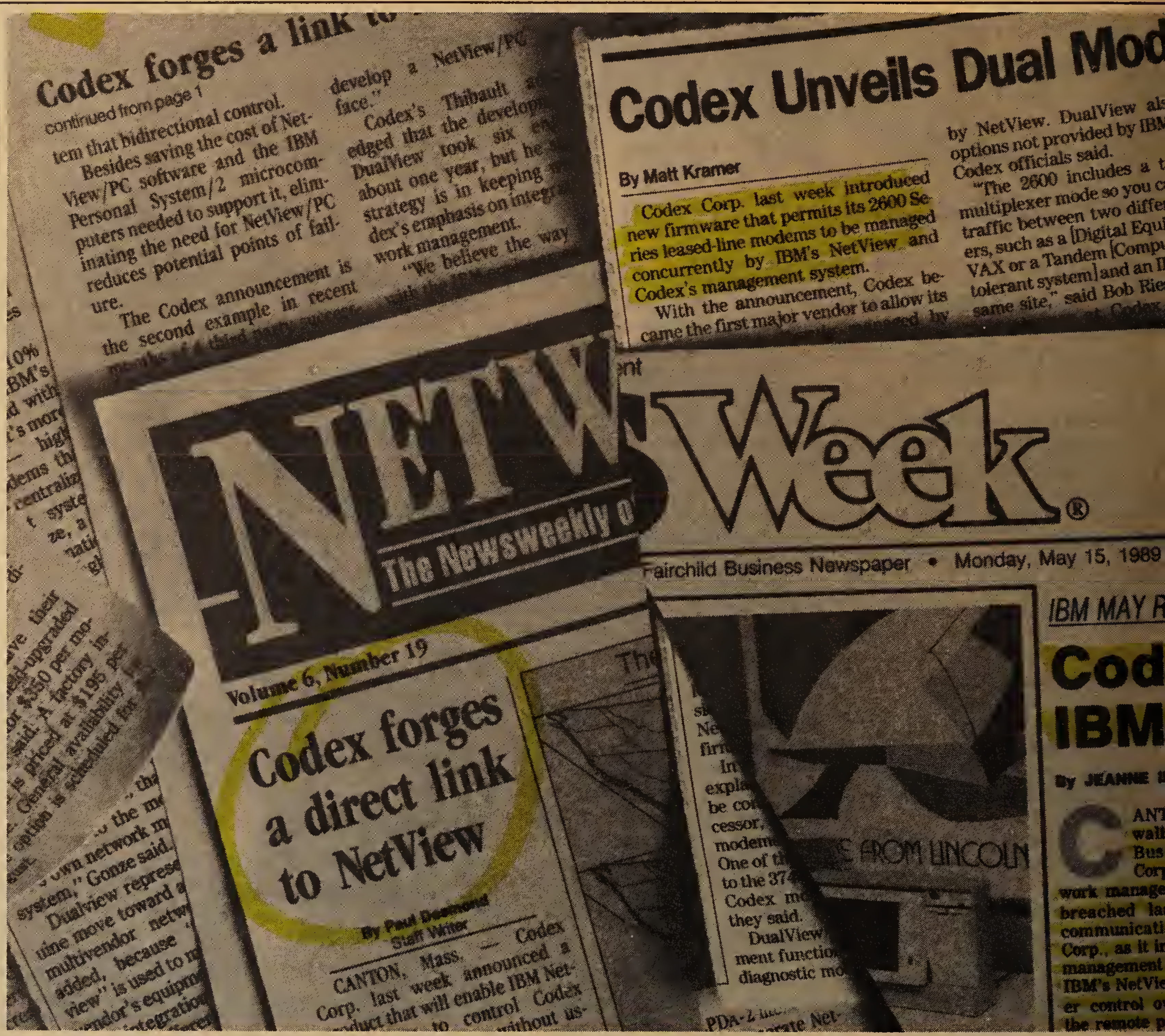
continued from page 13

viding free customer premises equipment. The FCC has not reviewed those contracts even though it has the authority to do so, and MCI continues to press for the agency to require AT&T to submit those contracts.

Two MCI promos in future. MCI Communications Corp. notified the Federal Communications Commission last week that on Nov. 14, it will begin offering two promotions — one for purchasers of T-1 access and one that allows users in the Southwest to form purchasing groups. Users that order T-1 access between Nov. 14 and Dec. 31, and request installation by March 15 will not have to pay for local T-1 access channels, T-1 channel termination, access coordination or central office connection. The promotion applies to MCI WATS, Hotel WATS, 800, Vnet, Prism I, Prism II, University WATS, digital data service or dedicated analog lines.

The second promotion, also running from Nov. 14 to Dec. 31, allows customers in Arkansas, Kansas, Missouri, Oklahoma and Texas to form joint purchasing groups to qualify for volume discounts. Groups must generate $500,000 in monthly charges to be eligible. Services available under the program include Execunet, Prism Plus and credit card services.

ONA meet set. The Federal Communications Commission announced last week that the Federal/State Joint Conference on Open Network Architecture (ONA) will hold its second meeting at 10:30 on Nov. 14 at the Boston Copley Place Marriott. The group meets periodically to work out implementation concerns about ONA. For more information, call Steven Gorosh in the FCC's Common Carrier Bureau at (202) 632-4047. ☐


Codex forges a link to
Codex Unveils Dual Mod
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MCI spearheads ANI developers' confab

continued from page 13

ing when it rolls out ISDN.

MCI has already begun using inband ANI for its own customer service operations and is hoping to improve its call-handling capability by 20%, according to Monica Laspia, manager of customer service at MCI. ANI will eliminate the 20 seconds it now takes customer service operators to get enough information to pull up a user's file. MCI's seven customer service centers handle two million calls per month.

Inband ANI capabilities have also been provided to a limited number of MCI customers, including the Social Security Administration, which uses it in its telephone processing operations, said Richard Liebhaber, executive vice-president of MCI.

Ronald Charnock, president of National Political Resources, Inc. (NPRI), a developer of telemarketing software, said companies have generally been able to reduce the length of customer service calls by between five and 15 seconds using ANI. AT&T's marketing services firm, American Transtech, cut the average response time of its operators by 12 seconds ("American Transtech uses ISDN for competitive edge," *NW,* July 24).

MCI will begin within the next few weeks to beta-test its inband ANI service with ACP, a voice processing company in San Francisco. Kenneth Jones, president of ACP, said ANI would significantly streamline the telemarketing operations his company provides for large corporations.

For example, Jones has conducted sweepstakes for General Foods Corp. in which customers enter the contests by dialing an 800 number to leave their name, telephone number and address with an operator or on a recorded message that is later transcribed. With ANI, the caller's number would be captured and cross-referenced with a national telephone directory to obtain names and addresses.

Jones also operates an 800 service for those who want to check the status of their frequent flier accounts with United Air Lines, Inc. To make sure they have the correct customer, the operator has to ask for the caller's account number and zip code. With ANI, the operator could check the caller's identity from the phone number.

Not only could ANI streamline applications, it could open the door to new operations. David Haney, senior consultant with Powers Communications in Dallas, has helped Dallas Carriers Corp. implement communications systems that track its trucks nationwide.

Drivers are primarily tracked by calling a dispatcher and giving the location and number of a pay phone. However, this information can be unreliable because drivers often collect numbers from phones along the entire route during previous trips, and if they are behind schedule, they sometimes call in a number from further down the route. ANI would allow the dispatcher to know the exact location from which the call was placed.

"What ANI means to a trucking company is to be able to tell a customer, with certainty, where the load is," Haney said. ◘

BOC sales agency programs hit stride

continued from page 13

to 347 vendors participating in 1988 agency programs. NATA also interviewed and amassed sales data from agencies and BOC managers.

The study says Centrex sales accounted for 42% of the total revenue generated by agents in 1988. WATS and 800 services sales were almost as active, accounting for 39% of all revenues generated by agents.

In 1988, commissions ranged from $23 to $141 per line for Centrex sales. Agents also often received bonuses for landing new accounts and meeting preset targets, according to the study.

Sales agents for one BOC each had average earnings from sales of net services of more than $1 million and generated about $7.5 million for the BOC. NATA declined to identify the BOC.

The study says the sales agency program is now expanding beyond the BOCs to independent telephone companies, such as Southern New England Telephone Co., and through NATA to numerous alternative long-distance carriers.

Although the report gives total sales figures for 1989, most of its more detailed data is for sales in 1988. The regional Bell holding companies sold an average of 15,200 Centrex lines through agents in 1988, reaping commissions of $105 per line.

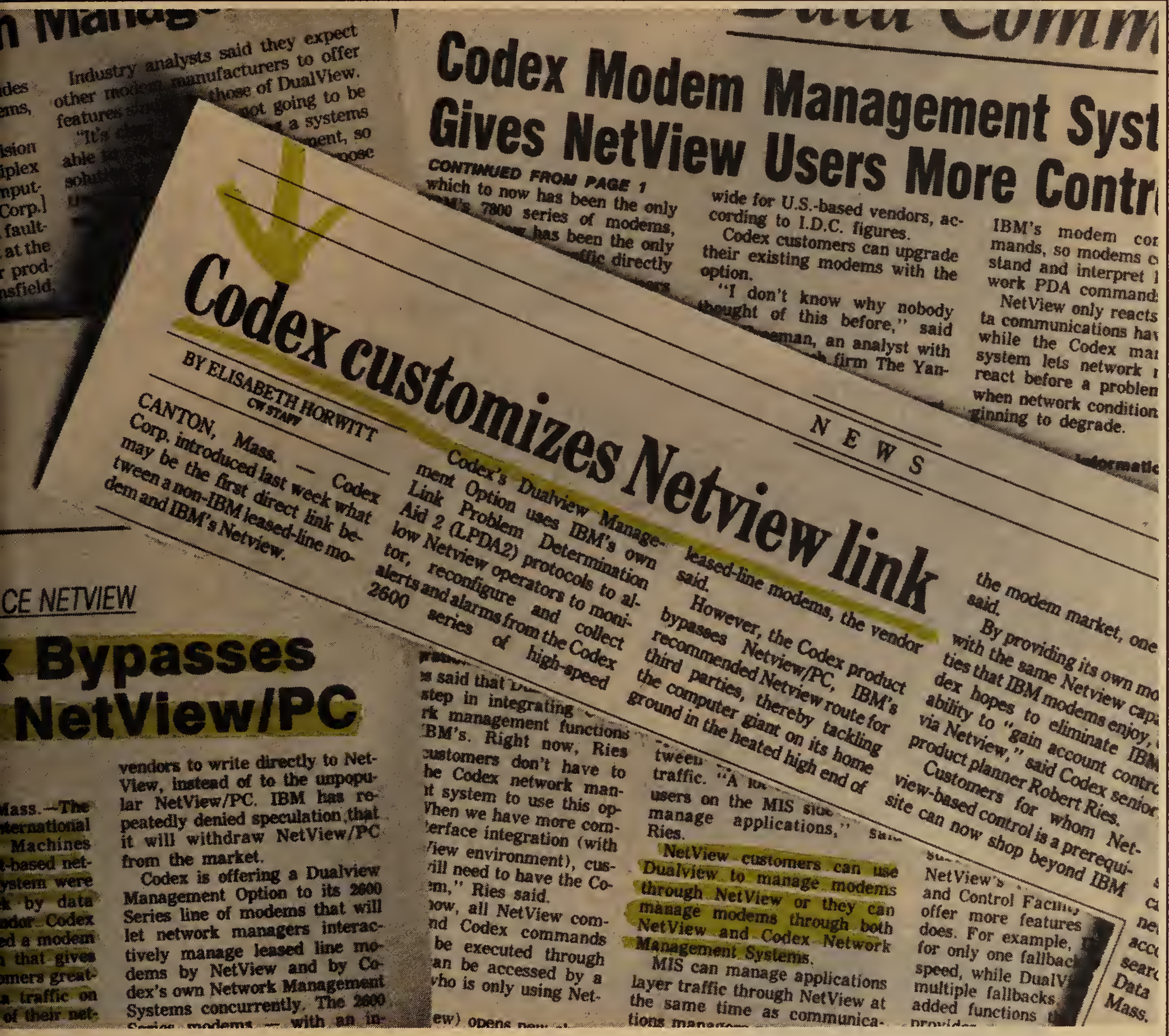
The average number of WATS and 800 lines sold through sales agents varied greatly by RBHC but averaged 1,900 lines per RBHC. The average commission paid per line was $700. Only three RBHCs offered WATS and 800 services to all agents in their territory, while other RBHCs made them available to agents in select BOCs or to select niche marketers, the study said.

Agents sold an average of 85 T-1 lines per RBHC and received an average commission of $7,440 per circuit, and they sold an average of 117 56K bit/sec lines per RBHC, reaping a commission of $1,246 per line in 1988.

The NATA study said 25% of the 347 agents surveyed generated about 87% of all network services sold through sales agents. About 50% of the agents generated 94% of sales.

The 347 agents employ about 2,000 people. The vast majority of the firms integrate sales of services into their overall marketing programs instead of dedicating salespeople to network services.

The NATA study costs $303 for members and $503 for nonmembers, and can be ordered by calling (800) 538-6282 or (202) 296-9800, extension 214. ◘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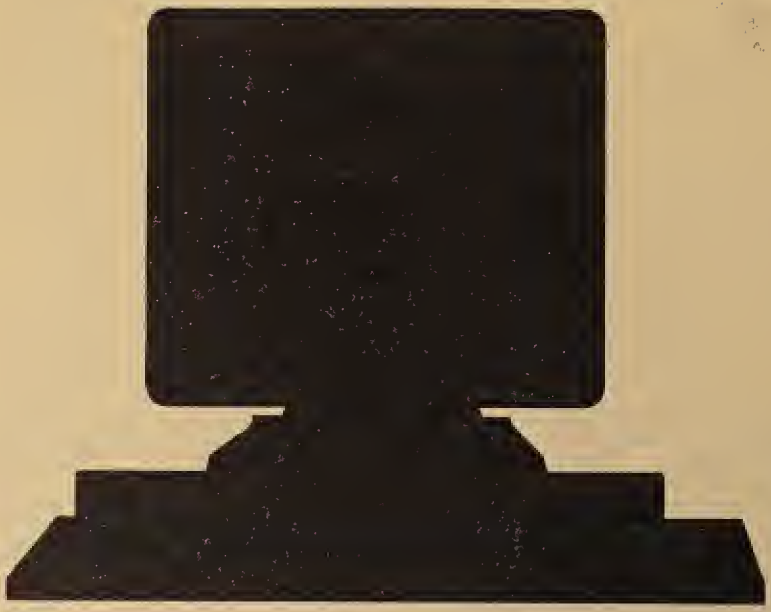
No system under $700/MIPS

No POSIX compliance

No symmetric multiprocessing



DEC

No open I/O bus across product line

No symmetric multiprocessing currently available

No multi-vendor binary compatibility

No system under $700/MIPS

IBM

No open architecture

No multi-vendor binary compatibility

No POSIX compliance

No system under $2500/MIPS

No symmetric multiprocessing

The above comparative product data is based on industry newsletters, industry analyst information, vendor price lists, vendor advertising material, and other material available as of September 7, 1989.
For a listing of information sources, please write Advertising, M.S. 9/S, Data General Corporation, 3400 Computer Drive, Westboro, MA 01580.

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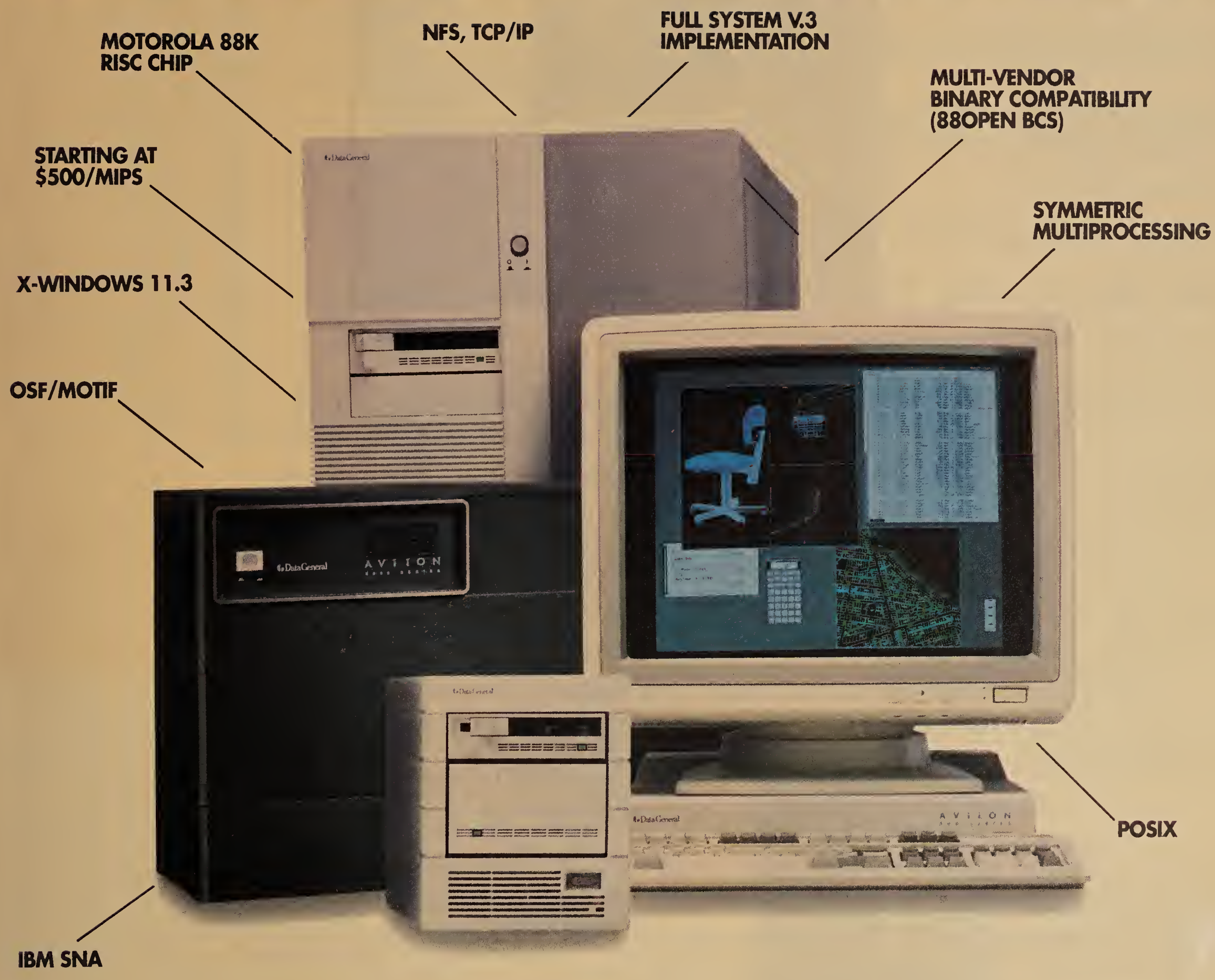

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Worth Noting

"DEC will definitely today — and probably for the next year or two — outdo IBM in peer-to-peer networking."

Dale Kutnick
President
Meta Group
A consulting firm
in Westport, Conn.

Data Packets

Hayes Microcomputer Products, Inc. last week introduced a modem that supports a broad mix of CCITT and de facto standards. Expected to ship in the first quarter of 1990, Hayes' Ultra 96 can communicate with nearly every existing modem on the market, the vendor said.

At a cost of $1,195, Ultra 96 operates in full duplex over dial-up or two-wire leased lines and supports transmission of asynchronous or synchronous data at speeds up to 9.6K bit/sec.

Ultra 96 supports a mix of error-checking protocols, including Link Access Procedure (LAP) M defined in CCITT V.42, LAP B defined in X.25 and Microcom, Inc.'s Microcom Network Protocol (MNP).

Ultra 96 also supports several data compression techniques. Using the data compression technique defined under CCITT V.42bis, Ultra 96 can achieve an effective throughput rate of 38.4K bit/sec under optimal line conditions, the company said. In addition, Ultra 96 supports Hayes' own Adaptive Data Compression (ADC) and MNP's data compression techniques, which enable it to achieve a throughput rate of 19.2K bit/sec when communicating with other modems using ADC or MNP.

Ultra 96 also complies with CCITT V.21 when operating at 300 bit/sec, V.22 when operating at 1,200 bit/sec, and V.22bis when operating at 2,400 bit/sec. Ultra 96 includes an internal packet assembler/disassembler and supports X.32.

Users in no hurry to jump to IBM LU 6.2

Many not yet convinced of peer protocol merits, prefer older method for program development.

By Paul Desmond
Senior Writer

Despite IBM's efforts to promote its LU 6.2 peer protocols as the means to develop program-to-program communications in an SNA network, some users are in no hurry to abandon older methods.

LU 6.2, a protocol used to establish peer communications sessions, has only been readily available for the past few years, and it is still not fully implemented in some major IBM software environments, such as IMS, a mainframe-based data base and communications system.

Consequently, many users have developed applications based on LU 0, a more mature session type that also supports program-to-program communications in a Systems Network Architecture network. LU 0 lets users plug in any proprietary protocol on top of the communications session, whereas LU 6.2 comes with built-in program-to-program protocols.

Advocates of LU 0 argue that they currently have little to gain from reworking existing applications to support LU 6.2.

"It's like the 3270," said Raymond Chan, vice-president of sales and marketing for Network Software Associates, Inc. (NSA) of Laguna Hills, Calif., a vendor that sells software supporting links between SNA and non-SNA devices via both LU 0 and LU 6.2. "The 3270 is not going to go away because there are so many applications out there written for LU Type 2, even though IBM is pushing distributed processing.

(continued on page 20)

AT&T unwraps two Skynet Clearlink VSAT offerings

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — AT&T introduced two Skynet Clearlink VSAT products at the recent Satellite Communications Users Conference here and announced the opening of a new shared hub just outside of Los Angeles.

AT&T also said Levi Strauss & Co. has awarded it a five-year contract to build a very small aperture terminal data network linking approximately 50 sites to the company's Los Angeles office through AT&T's new shared hub.

AT&T rolled out Clearlink Plus, a VSAT installed at remote customer locations that sends and receives satellite signals, and Clearlink Corporate Hub Station, an earth station situated at a customer's data processing center that acts as a central switch for a satellite net. Both products are designed for use on Ku-band nets.

The new shared hub in San Bernardino, Calif., will provide two-way transmission services to customers from the Rocky Mountains to the West Coast. The hub will act as a central network switch for subscribers to AT&T's Skynet Clearlink Services. AT&T has other shared hubs in Marietta, Ga., serving the Southeast and Midwest, and in New York, serving the Northeast.

The Clearlink Plus and Clearlink Corporate Hub Station are manufactured by Tridom Corp., a wholly owned subsidiary of AT&T.

Dish details

The Clearlink Plus VSAT is equipped with three ports, each capable of handling a different communications protocol, such as IBM's Synchronous Data Link Control, X.25 and Binary Synchronous Communications, as well as asynchronous data. Additional port support is available by adding extra expansion cards.

The VSAT can support data transmission speeds of 32K or 64K bit/sec and several satellite access methods, including Time Division Multiple Access (TDMA). TDMA is a digital method of multiplexing data that combines a number of signals over a common path by organizing them sequentially and transmitting groups of signals in bursts.

The Clearlink Plus satellite dish comes in three sizes: 1.8-, 2.4- or 3.5-meter diameters.

The Clearlink Corporate Hub Station is a private hub. James Stratigos, vice-president of marketing at Tridom, said users that require at least 500K bit/sec of capacity could cost-justify the investment in the private hub.

The Corporate Hub Station

(continued on page 21)

User OSI application plans

Please indicate whether you have implemented or plan to implement any of the following OSI standards:

Type	Implemented	Plan to implement	No plans	Don't know	No answer
File Transfer, Access and Management	5%	10%	68%	4%	13%
Virtual Terminal Protocol	19%	20%	44%	4%	13%
Electronic mail (X.400)	3%	29%	52%	3%	13%
Directory services (X.500)	1%	13%	68%	5%	13%
Packet switching (X.25)	25%	28%	31%	3%	13%
Common Management Information Protocol	1%	9%	69%	6%	15%

Results are from a survey of 100 MIS managers in Fortune 1,000 companies.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

Survey reveals few users currently plan to use OSI

Lack of products, user attitudes hinder progress.

By Jim Brown
Senior Editor

NEWTON, Mass. — A lack of products conforming to Open Systems Interconnection protocols and user unwillingness to abandon existing network investments will slow migration to OSI, according to a recent survey.

The dearth of OSI products is making users hesitant about making immediate wholesale changes to existing proprietary networks in which they've invested heavily.

The survey of 100 MIS managers in Fortune 1,000 companies was conducted by Business Research Group (BRG), a market research firm based here. The survey found that the majority of respondents — 82 of 100 — said they felt OSI products are not yet widely available and 13 said vendors are only just starting to roll out OSI products.

"Until users see an easy migration path, they are not going to run out, buy OSI-based products and jeopardize what they have," said Kevin O'Neill, BRG's vice-president of network research and consulting.

Instead, users are spending more time improving the performance of existing networks than trying to investigate the benefits of OSI, he added.

The survey also found that 36 of the 100 respondents plan to use OSI to augment proprietary networks, such as IBM's Systems Network Architecture and Digital Equipment Corp.'s DECnet. The respondents said they will implement the technology to link existing networks rather than replacing those nets.

Another 31 users said they will not use OSI networks until products are more widely available. Ten users said they are implementing OSI test networks, while 10 others said they plan on selecting OSI-based products over nonstandard products during the next few years.

Many government and academic users are also putting off OSI migration plans and sticking with Transmission Control Protocol/Internet Protocol until OSI products mature (see "Users rely on TCP/IP, wait for interoperable OSI wares," page 25).

"Many users view OSI as a long-term strategy," O'Neill said. "OSI is not so much of an immediate issue because of the lack of OSI-based products."

With the exception of X.25, the majority of users said they currently have no plans to implement any major OSI applications. More than two-thirds of the respondents, for example, said they do not plan to use OSI's File Transfer, Access and Management, X.500 directory services or Common Management Information Protocol for network management (see chart, this page).

> "Until users see a migration path, they are not going to jeopardize what they have."

▲▲▲

Moreover, 44 users said they think they'll have to wait at least three to five years before products supporting OSI applications are generally available. Forty-eight users disagreed with that time frame but offered no clue as to when they thought OSI products would hit the market. O'Neill said some users think OSI prod-

(continued on page 20)

No hurry to jump to LU 6.2

continued from page 19

LU 0 is the same case — there are so many applications out there designed for LU 0."

While that may be true of existing applications, users and analysts said it is tougher to make a case for developing new applications based on LU 0.

"Any new connections we develop are going to be LU 6.2 connections," said Peter Tittler, vice-president of operations at Avis Rent A Car System, Inc. in Garden City, N.Y. "[LU 6.2] is IBM's stated direction, so we know anything we create now should probably be using that."

Conformance to LU 6.2 will help ensure that Avis applications will support links to applications owned by other travel industry companies with which Avis may want to communicate.

But Avis has no plans for a wholesale migration of the LU 0 applications it has already developed. Those applications have evolved over the past several years, prior to IBM's offering of an adapter that enables IMS to support LU 6.2. Avis runs IMS under MVS on its IBM mainframes.

The company uses LU 0 to support links from computers owned by other companies, such as airline reservation networks, to its mainframe in Garden City.

Other companies also used LU 0 because it was the only practical option. When Visa International, Inc. of San Mateo, Calif., was developing applications to ship credit card authorization data between its IBM 3090 mainframes and IBM Series/1s or Personal Computers, it chose LU 0, said Marilyn DePaoli, a Visa vice-president.

"When we made the decision, [LU 6.2] wasn't even an option," DePaoli said. At that time, about three years ago, Visa's mainframes ran TPF Release 1, which did not support LU 6.2. Although LU 6.2 is supported under the current TPF Release 2.3, she said, Visa is in no hurry to migrate away from LU 0. "There just hasn't been a business justification at this point to make LU 6.2 a priority," she said.

As Visa looks to new applications, such as forging links from its mainframes to devices it does not own, LU 6.2 may be a more logical choice because it is a more universal standard than LU 0, DePaoli said.

Looking ahead

Users building new applications that will be used for an extended period of time should look to LU 6.2, according to analysts.

"If you were starting a system from scratch, I would recommend going with LU 6.2 because it was designed keeping in mind the mistakes of the other protocols," said William Freitag, a telecommunications consultant with Computer Task Group, Inc. in Buffalo, N.Y.

Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C., agreed with Freitag.

"If I were in management in an end-user shop, I would look very closely if someone proposed doing something in LU 0," Dzubeck said. "If you have a problem with an LU 0 implementation, don't expect anyone [from IBM] to come in and debug it for you." ☒

Few users plan to use OSI

continued from page 19

ucts will reach the market in 18 to 24 months.

Compounding the lack of widely available OSI-based products, large established vendors such as IBM and DEC are not rushing to provide OSI-compliant products because OSI standards have not been finalized, O'Neill said. These vendors are more likely to continue to enhance their proprietary architectures while slowly phasing in OSI.

In DEC's case, DECnet is being enhanced to support OSI features based on the OSI standards that exist but will not be fully OSI-compliant for several years.

"Major vendors adopt OSI at their own peril," O'Neill said. For instance, these vendors do not want to migrate customers away from a proprietary architecture, which locks the customer into a single vendor, to the more open approach promised by OSI.

However, other vendors, such as Unisys Corp., Hewlett-Packard Co. and NCR Corp., will be more willing to rush OSI products to market in order to convert users, O'Neill said.

New companies and companies that are not major market players now are the suppliers

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most likely to adopt OSI aggressively, he added.

Because few OSI products are available today, users are unable to identify which vendor is the clear leader in OSI development, according to the survey. In fact, 45 of the 100 users surveyed said they didn't know which vendor leads the pack in OSI product development. Of the remaining users, 19 said DEC was ahead of other vendors in OSI product development. IBM was close behind with 12 respondents. HP, Wang Laboratories, Inc., AT&T, Bull Worldwide Information Systems, Inc. and Data General Corp. were also mentioned.

The survey found that 60 of the users think integrated net management will be the first application that fully supports OSI standards. Another 23 users did not agree with that assessment, while 17 voiced no opinion. ◼

AT&T unwraps VSAT offerings

continued from page 19

can support an unlimited number of VSATs. It also features a packet switch capable of sending 1,000 packet/sec and a network control computer that allows customers to access multiple data centers from their premises. The Corporate Hub Station is compatible with AT&T's Unified Network Management Architecture.

The station's antenna is 4.5 or 9.2 meters in diameter. Both products are scheduled to begin shipping in January.

Stratigos declined to supply pricing on either the Clearlink Plus or the Corporate Hub Station.

Levi Strauss decided to replace its terrestrial data net with a VSAT setup to increase network reliability, said Gevenie Delsol, director of business communications at Levi Strauss' San Francisco headquarters.

In addition to greater reliability, she said her company expects its data communications costs to be cut by 40%.

Levi Strauss' existing network consists of AT&T 56K bit/sec Dataphone Digital Service circuits connecting the company's four local distribution centers in California to the San Francisco headquarters. Multiplexed off those lines are 9.6K bit/sec lines that exchange data with some 50 remote manufacturing and sales offices.

The data route

Under the VSAT network, AT&T's Skynet Direct Service will be used to transmit data between Levi Strauss' four distribution centers and its central data processing center in San Francisco. The Skynet Direct Service is a point-to-point satellite offering that operates at 64K to 1.5M bit/sec speeds.

About 50 remote sales and manufacturing sites outfitted with the Clearlink Plus VSATs will route data to AT&T's shared hub in San Bernadino. Data will then be transmitted from the hub to the user's Los Angeles offices over dedicated lines provided by AT&T's Accunet Spectrum of Digital Services.

AT&T said it will also use the terrestrial lines to link the shared hub to Levi Strauss' host computers in San Francisco.

Levi Strauss' VSAT network will transmit interactive and one-way data for sales, inventory and production information from the remote offices to AT&T's shared hub. Installation of the network is scheduled to begin in January and should be completed in April.

The VSAT network will make Levi Strauss less susceptible to disasters such as the recent San Francisco earthquake and everyday mishaps that sometimes sever terrestrial lines, Delsol said.

"We'd be able to [reroute] much of the network traffic to unaffected sites" with a VSAT network, she said.

Levi Strauss lost its San Francisco data processing center for almost two days after the quake due to a loss of electricity, Delsol said. Once power was restored, the network was back up in about an hour.

Most of the company's other network problems were the result of trouble in the local loop, such as lines being severed by construction or road crews, she said. "We were looking for an alternative to bypass the local loop."

Delsol said the company will also begin a videoconferencing pilot to supplement meetings between design staff in California and manufacturing sites in Hong Kong.

"This should cut some of the design process" and reduce product lead time, she said. ◼

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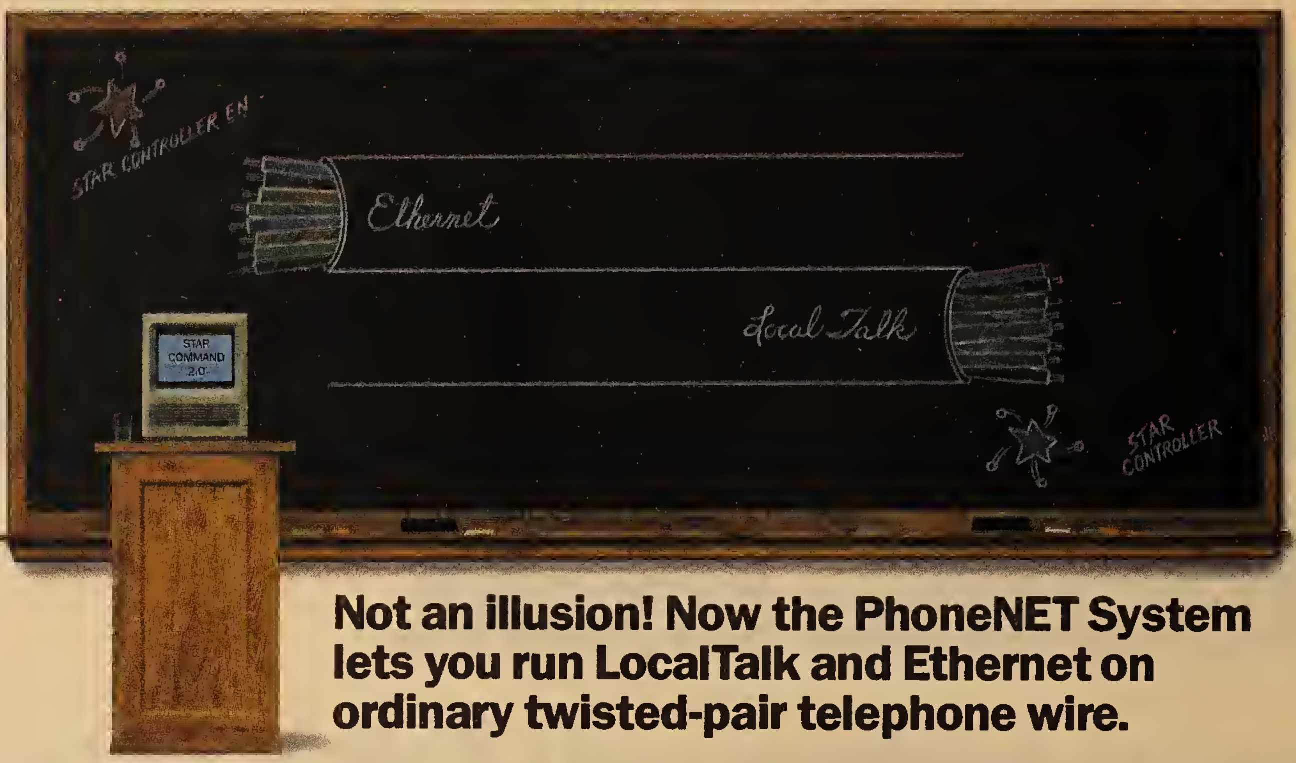

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Plus, each StarController comes with StarCommand 2.0 software, which continuously monitors the network and alerts the network manager to any problems. Running under MultiFinder and password-protected, StarCommand will isolate and diagnose problems without interfering with the rest of the network. And since it works over a dedicated management bus, you can troubleshoot even if the network is down.

StarController EN:
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- AUI interface for connection to coax based Ethernet LANS
- Diagnostic LEDs for power, ROM, RAM, and to indicate packet transmission to each port
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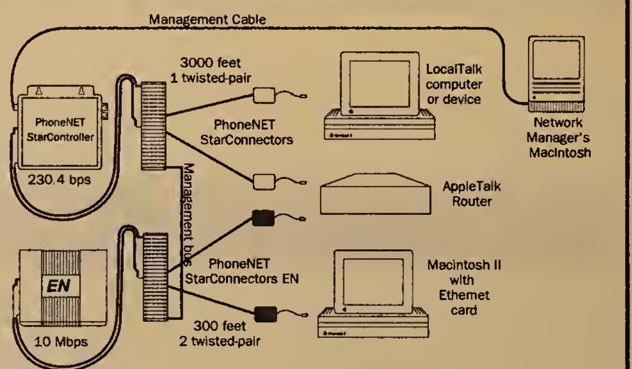

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See the FAXNeT Form on Page #58

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

> “With LAN Manager, Microsoft is clearly winning the war for users’ minds by focusing on client/server computing rather than simple file and print sharing.”
>
> **John McCarthy**
> Analyst
> Forrester Research, Inc.
> Cambridge, Mass.

Netnotes

Mylex Corp. of Fremont, Calif., is demonstrating a line of 32-bit Extended Industry Standard Architecture (EISA) boards at Comdex/Fall in Las Vegas this month, including an Ethernet adapter and a Small Computer System Interface (SCSI) I/O controller.

The boards are designed to exploit the Intel Corp. 80386 and 80486 microprocessors in a high-performance server environment by providing a wider data path than the traditional eight- or 16-bit boards.

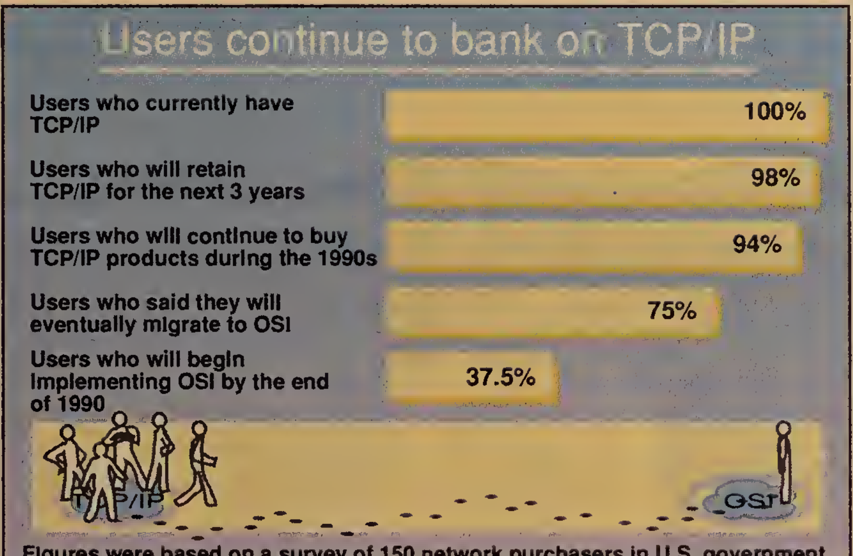
The LNE390A Ethernet Adapter has a National Semiconductor Corp. DP8390 chip for off-loading communications and buffer management from the host processor. Shared buffers enable data packets to be assembled at up to 32M bit/sec.

The product comes with drivers for Novell, Inc.’s NetWare 386 1.0; it is priced at $425. Mylex expects it will ship before year end.

The DCE376 SCSI board is a caching I/O controller that supports as many as seven SCSI devices. It has a 16-MHz 80376 processor and as much as 16M bytes of cache random-access memory. Using the EISA master mode, it achieves Direct Memory Access transfer rates of 26M bit/sec.

Available by year end, the DCE376 supports DOS, OS/2, NetWare 2.15 and NetWare 386, Unix and Xenix. Prices start at $1,700 for a controller with 1M byte of cache RAM.

Mylex Corp. is located at 47650 Westinghouse Drive., Fremont, Calif. 94539; (415) 683-4600.



Figures were based on a survey of 150 network purchasers in U.S. government, academic and commercial sites.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INFONETICS, INC., SANTA CLARA, CALIF.

Users rely on TCP/IP, wait for interoperable OSI wares

Study finds users putting off migration to OSI.

By Laura DiDio
Senior Editor

SANTA CLARA, Calif. — While most government and academic network users say they will migrate from TCP/IP to Open Systems Interconnection standards, they will put off that trek until vendors can provide interoperable OSI products, according to users and a new study.

The study, “TCP/IP: User Requirements and Buying Plans,” conducted by Infonetics, Inc., is based on a survey of 150 government, university and research network users. Among other things, it showed that users have resolved to migrate to OSI but will not abandon their investments in Transmission Control Protocol/Internet Protocol.

According to the survey, 75% of the 150 users will migrate to OSI, but an overwhelming 98% will retain their TCP/IP networks for at least the next five years, said Michael Howard, the Infonetics vice-president in charge of the report.

Underscoring their dedication to TCP/IP, 94% of the users said they will continue to buy TCP/IP products during 1990, even as the Government OSI Profile (GOSIP) becomes mandatory for all new government procurements.

For most users, even those that have installed pilot OSI networks, the emerging standard remains a question mark, albeit one that is becoming clearer with the passing of time. By contrast, TCP/IP is 12 years old.

Louis Whipple, an electrical engineer at the National Aeronautics and Space Administration’s Lewis Research Center in Cleveland, typified most users’ feelings about OSI vs. TCP/IP.

“GOSIP is pretty much the reason we’re migrating to OSI, but it’s really not available yet. TCP/IP works, it’s readily available now, and it gets the job done just fine,” Whipple said.

The NASA Lewis Research Center, which is responsible for the development of space propulsion systems, doesn’t have any OSI nets installed but will comply with the GOSIP mandate that takes effect next August.

Stephen Northcutt, a systems analyst at the Naval Surface Weapons Center in Dahlgren, Va., a navy research lab that develops the Aegis weapons system and other onboard surface missile systems, concurred. “TCP/IP is here now, and it works. We have no intention of fixing something that isn’t broken, but we will comply with GOSIP,” he said.

Northcutt said the migration to OSI is a priority for the Naval Surface Weapons Center, but he expressed serious doubts as to whether or not all parts of the standard will be finalized within the next year.

> An overwhelming 98% will retain their TCP/IP networks for at least the next five years.

▲▲▲

The Naval Surface Weapons Center has begun experimenting with OSI on a test network of Sun Microsystems, Inc. workstations to perform simple file transfers. But Northcutt said the center, and indeed most other users, cannot currently perform wide-area OSI internetworking because the standard is not complete.

“As it stands now, the intermediate systems to intermediate systems part of the standard, which would enable us to do in-

(continued on page 28)

Oracle unveils OS/2 LAN data base server

Company positions new offering as competition for Ashton-Tate and Microsoft’s SQL Server.

By Susan Breidenbach
West Coast Bureau Chief

BELMONT, Calif. — Oracle Corp. officially entered the local network data base server market last week with the release of Oracle Server for OS/2, a product that will compete against the Sybase, Inc. SQL Server being marketed jointly by Ashton-Tate Corp. and Microsoft Corp.

Unlike Oracle’s previous products for microcomputers, Oracle Server for OS/2 is a full implementation of the data base giant’s Oracle 6.0 relational data base management system for mainframes and minicomputers. The new product also has extensions that exploit the unique features of OS/2.

Oracle Server for OS/2, which requires a computer with an Intel Corp. 80386 processor, can share data transparently with the 80-plus other versions of the Oracle relational DBMS. It also has built-in support of Novell, Inc.’s Sequenced Packet Exchange/Internetwork Packet Exchange (SPX/IPX) protocols, the Named Pipes interprocess communications facility in Microsoft Corp.’s OS/2 LAN Manager and IBM’s industry-standard Network Basic I/O System application interface.

“We think we have a real chance to dominate the OS/2 data base server market,” said Marc Benioff, director of desktop products for Oracle. “We’re taking this market very seriously now — that’s why we hired Jim [Reilly] and John [Kish].”

Reilly, director of channel programs at Oracle, and Kish, director of product management, were heading up the SQL Server marketing team at Ashton-Tate until about a month ago, when Oracle stole them away.

(continued on page 28)

Unisys offers server for BTOS/CTOS workstations

By Susan Breidenbach
West Coast Bureau Chief

SAN JOSE, Calif. — The Network Computing Group of Unisys Corp. last week introduced a multiple-processor server for use with the company’s proprietary BTOS/CTOS workstations, and a series of products that improve the integration of DOS into BTOS/CTOS local-area network environments.

The new XE-530 server, based on Intel Corp. 80386 microprocessors, runs the same operating system as the BTOS/CTOS workstations, an approach similar to that used by Sun Microsystems, Inc. and Hewlett-Packard Co.’s Apollo Division.

The proprietary Unisys network looks slow on paper, having a bandwidth of 1.8M bit/sec. However, performance is maximized by a High-Level Data Link Control polling technique that polls active nodes more frequently than less active ones.

“Ethernet’s actual throughput is generally about 10% to 40% of its official 10M bit/sec bandwidth so we’re not really that much slower,” said Bruce Halvorsen, manager of communications and training for Unisys’ distributed systems division.

The new XE-530 server can have from one to five internal processors, enabling users to expand the server as the network grows. Another 25 processors can be added via five expansion chassis, which hold five processors each.

BTOS/CTOS applications

Each processor supports as many as 32 intelligent nodes, which can be a combination of BTOS/CTOS workstations and IBM Personal Computer ATs or compatibles. The server supports the thousands of vertical and horizontal applications that have been developed for the BTOS/CTOS operating system.

The XE-530 is scheduled for release in March 1990. Prices start at $27,995 for a single-processor configuration with 4M bytes of memory, a Small Computer System Interface controller, a 134M-byte hard disk and a 150M-byte tape drive.

Halverson said the BTOS/CTOS networks are marketed as alternatives to minicomputers and offer better price and performance. They now boast an installed base of approximately 700,000 users.

The new DOS enhancements make use of the 80386’s virtual

(continued on page 28)

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Unisys offers server for BTOS/CTOS

continued from page 25

machine capability, enabling users on 80386-based BTOS/CTOS workstations to run multiple DOS and multiple BTOS/CTOS sessions simultaneously.

Enhancements

The enhancements include a new graphics controller and three new software products: PC Emulator 4.0, ClusterShare 1.3 and ClusterShare 3270. The graphics controller and emulation software enable BTOS/CTOS workstations to run DOS Video Graphics Array (VGA) applications at video speeds several times faster than that of an IBM VGA controller, Unisys said.

The graphics controller supports screen resolutions of up to 1,024-by-768 pixels and can be configured with 256K or 512K bytes of video random-access memory. Prices range from $900 to $1,650. The PC Emulator 4.0 software is priced at $214. Both products are expected to be available in January.

The ClusterShare software is based on Microsoft Corp.'s Server Message Block (SMB) client/server protocol and enables DOS-based personal computers to share files, printers and hard disks on a BTOS/CTOS network. Control software runs in the server, and a ClusterCard and software are added to the personal computers.

The ClusterShare 1.3 software is priced from $220 to $440; the ClusterShare 3270 Emulator costs $250. Both are expected to be available in December. ◘

Oracle unveils OS/2 LAN data base server

continued from page 25

Along with the product announcement, Oracle released results of an independent audit performed by data base expert Codd and Date Consulting, Inc. of San Jose, Calif. The benchmarks showed Oracle Server supporting 10.92 transactions per second. SQL Server supported 8.99 transactions per second using the data base industry's standard TP1 Benchmark.

The SQL Server score differs from the 10.54 transactions per second obtained in a TP1 Benchmark commissioned by Microsoft this past summer. For the moment, though, Oracle is claiming to have the "fastest data base server for OS/2."

Performance issues aside, Oracle Server for OS/2 can currently be accessed from two of the world's most widely used personal computer business applications — Lotus Development Corp.'s Lotus 1-2-3 and Ashton-Tate's dBase III Plus — whereas SQL Server cannot.

"Oracle Server works with dBase III Plus applications now, and there won't be a dBase front end for SQL Server for six to eight months so we think we have a real window of opportunity," Kish said.

Released last April, the OS/2 SQL Server has been steadily gathering momentum, and there is some evidence that it is beginning to drive LAN Manager sales. However, it is a new system-level product, and tools for developing SQL Server applications are still scarce.

Oracle Server can be accessed from IBM's DB2 and SQL/DS data bases, as well as from Digital Equipment Corp.'s RMS. Also, Oracle Server applications can be written in COBOL, FORTRAN and C.

Oracle is also touting the product's ability to share data transparently with the Oracle relational DBMSs that now span more than 80 different operating systems, including Unix, DEC's VMS, IBM's MVS and Banyan Systems, Inc.'s VINES. Oracle pointed out that the different versions of SQL Server cannot exchange data, nor can OS/2 SQL Servers communicate.

Perhaps the biggest selling point is Oracle Server's support of NetWare's native transport and client/server protocols, IPX and SPX, enabling Oracle to leverage the installed base of NetWare. By contrast, the OS/2 SQL Server is tied closely to LAN Manager, which has few users as yet.

"We don't have any vested interest in the network operating system war," Benioff said. "Oracle is ready to sit back and wait and see who wins."

Oracle Server for OS/2 is priced at $2,499, the same as SQL Server, and a developer's version supporting as many as three users is available for $699. Oracle is promoting the product by bundling it with six months of free support. ◘

Users rely on TCP/IP, wait for OSI wares

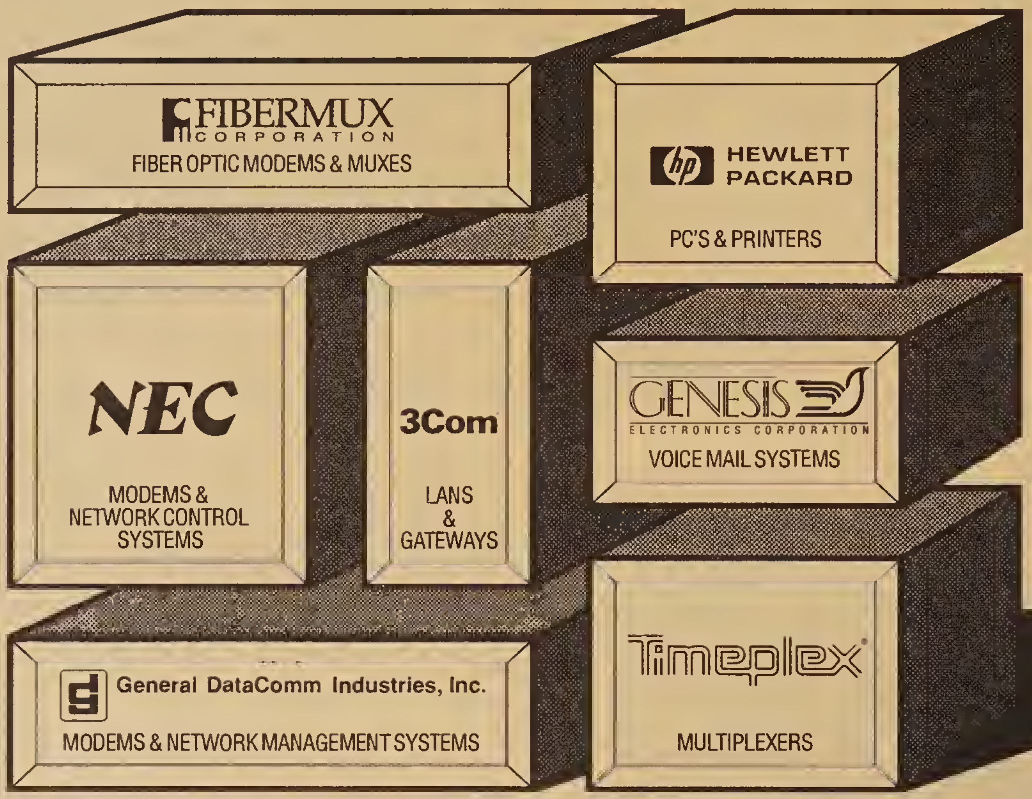
continued from page 25

ternetwork routing, is still in the draft stages," Northcutt said. "And that tells me that it will be difficult to implement large scale OSI nets anytime soon." The weapons center plans to install its first OSI network sometime after August 1990, when GOSIP procurement becomes mandatory.

Jeffrey Schiller, the network manager at the Massachusetts Institute of Technology, said, "TCP/IP suits our needs and OSI isn't real yet, so we're sticking with TCP/IP for the foreseeable future."

Most users' eventual transition to OSI will be complicated by the fact that it is a much more complex standard than TCP/IP. "Because it's an international standard, dozens of countries have contributed [to it]. The result is we users are getting a much fatter and bloated protocol stack with more options than we know what to do with," Northcutt said.

Also muddying the waters, he said, is users' current lack of expertise with the new standard. "I don't doubt that two or three years down the road, file transfers using X.400 services and [File Transfer, Access and Management] will work across enterprise networks, but I'm not at all certain that we'll have all the pieces in place by August 1990. Infonetics' Howard agreed, saying that in the interim, many users will opt to install hybrid networks. ◘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THE POWER IS ON

See the FAXNeT Form on Page #58

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Worth Noting

Penn Mutual Life Insurance Co. has operated its primary data processing and network operations from a SunGuard Recovery Systems disaster recovery site longer than any company in history. The Horsham, Pa.-based firm continues to use SunGuard facilities after moving into them when its Philadelphia data center was destroyed in a fire May 30.

Association Watch

The **Tele-Communications Association, Inc. (TCA)** gave its Prestigious Service Award to **Jerry Appleby,** current chairman of the board, at its annual conference last month in San Diego.

The Prestigious Service Award is given annually to a TCA member who makes a significant contribution to the association and its objectives.

Appleby, who is vice-president of telecommunications services for Security Pacific Automation Co., Inc. in Glendale, Calif., has held a variety of leadership positions in TCA since becoming a member in 1977. In 1988, Appleby was president of TCA. This year, as chairman of the board, Appleby represented TCA at a hearing of the U.S. House of Representatives Subcommittee on Telecommunications and Finance.

The **Association of the Advancement of Communications Technology** is sponsoring a morning educational meeting on T-1 and digital networking for voice, data and image applications on Nov. 15 at Canon USA, Inc. headquarters in Lake Success, N.Y.

(continued on page 34)

Selling upper management on voice-messaging systems

One executive's strategy to win project support.

By Wayne Eckerson
Staff Writer

NEW YORK — When Mike Taussig implemented a voice mail system for Colgate-Palmolive Co.'s corporate offices here, he worked hard to win top management's support.

Taussig, associate director of corporate telecommunications for the consumer products firm, purchased an AT&T Audix voice-messaging system late last year because a shortage of clerical help in the city was making it difficult to cover phones. Many incoming calls went unanswered, and many employees became so desperate they brought in answering machines from home.

While convinced the system was needed, Taussig knew his real challenge was to ensure that the system would be widely accepted and properly used by the firm's 1,000 employees at the New York office. He was aware that in some companies, executives had ordered network managers to dismantle voice processing systems that hindered, rather than enhanced, corporate communications.

"I had heard too many horror stories of [voice-messaging] systems that were rejected by top management because they weren't administered properly," Taussig said.

To avoid that fate, Taussig drew up a master implementation plan for the Audix voice-messaging system that was targeted at Colgate-Palmolive's top 50 executives. The plan called for each executive to be given an individual sales pitch and training session, after which they could decide if they wanted to subscribe to the system.

"We knew if we could get top management excited about using the system, everyone else would follow," Taussig said.

Top-down approach

Before approaching the firm's top executives, Taussig conducted a two-month pilot test last winter among 100 people in the in-

(continued on page 32)

Colgate-Palmolive's voice mail strategy

1. Pilot-test the system in the information systems department to iron out bugs.
2. Demonstrate the system individually to top executives.
3. Offer group training sessions for the staff of each executive who subscribes to the system.
4. Make subscribing to the system voluntary but require all staff to attend a training session before they can use a voice mailbox.

SOURCE: COLGATE-PALMOLIVE CO., NEW YORK
GRAPHIC BY SUSAN J. CHAMPENY

EXECUTIVE BRIEFS

BY BARTON CROCKETT AND WAYNE ECKERSON

Grow your own LAN managers. The old-fashioned law of supply and demand has made it too expensive for many companies to hire skilled local-area network managers from the outside, assuming they can be found.

As a result, companies are recruiting LAN managers from the ranks of their own data processing or telecommunications departments.

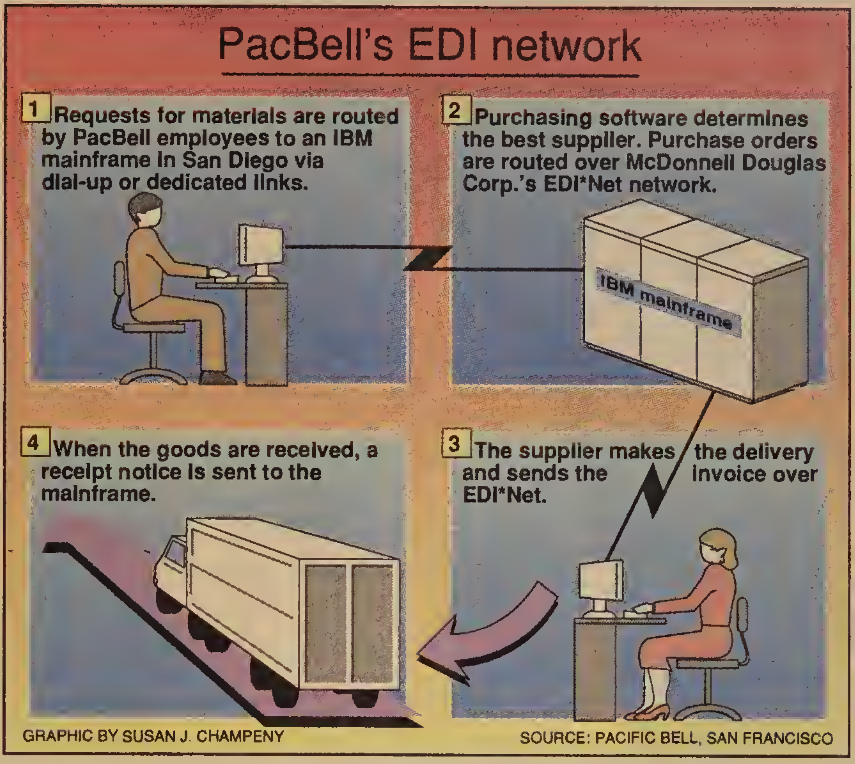
"We've come to the conclusion that we have to train our own LAN managers," said David Chapman, associate director of communications services at the University of California at Santa Barbara, Calif.

Chapman said he recruits people who have basic organizational skills and some knowledge of voice or data wiring. He then provides extensive in-house training, which includes computer-based training, reading assignments and lots of hands-on experience.

Unfortunately, once individuals are brought up to speed, they are often lured away by higher salaries offered elsewhere, Chapman said. "We count on a certain amount of turnover."

Large companies can pay the hefty salaries that experienced local managers now fetch on the open market, but many only

(continued on page 34)



PacBell's EDI network

1 Requests for materials are routed by PacBell employees to an IBM mainframe in San Diego via dial-up or dedicated links.

2 Purchasing software determines the best supplier. Purchase orders are routed over McDonnell Douglas Corp.'s EDI*Net network.

3 The supplier makes the delivery and sends the invoice over EDI*Net.

4 When the goods are received, a receipt notice is sent to the mainframe.

GRAPHIC BY SUSAN J. CHAMPENY
SOURCE: PACIFIC BELL, SAN FRANCISCO

PacBell's use of EDI helps trim expenses

Electronic data interchange will enable carrier to reduce inventories and close half its warehouses.

By Barton Crockett
Senior Editor

SAN FRANCISCO — A top Pacific Bell executive estimates that, by year end, EDI will enable the carrier to shut down half of its warehouses and reduce its workforce significantly.

Electronic data interchange allows Pacific Bell to practice just-in-time inventory management, according to Joseph Yacura, executive director of network procurement services. That is helping the carrier reduce its inventories and will enable Pacific Bell to close half of its 18 warehouses by the end of this year.

Six warehouses have already been shut down since the EDI program began in mid-1988, Yacura said. Thus far, total annual savings from the warehouse closings are estimated to be $200,000 to $250,000 per year.

The warehouses that Pacific Bell closed employed between 20 and 50 people. Yacura declined to say exactly how many Pacific Bell workers have been displaced, but he said that much of the savings is attributable to reduced labor costs. Yacura added that displaced employees are being offered other positions within the company.

He said Pacific Bell has invested about $275,000 in staff time and in new software to support the EDI program. But the EDI implementation will be extremely profitable because expenses are largely onetime investments and cost savings will continue indefinitely.

"We're finding you can get a real payoff from EDI," Yacura said.

According to Yacura, EDI is the linchpin of Pacific Bell's just-in-time inventory management efforts. Without EDI, just-in-time inventory management would be impossible, he said, because delivering purchase orders via the mail takes too long.

"We find that mailing and typing purchase orders adds about five days to the procurement process," Yacura said. "With products that need a quick turnaround, that's simply too long."

Meeting the deadline

Pacific Bell's purchasing department promises to deliver materials to company employees within two days of a request. Since EDI messages can be delivered almost instantaneously, Yacura said Pacific Bell can now rely on its vendors to deliver several categories of products within the deadline.

The carrier is removing these goods from its warehouses. About 5,000 types of goods have been removed thus far.

In Pacific Bell's EDI network, company employees enter requests for supplies into one of about 850 purchasing terminals located in the carrier's offices throughout California. These requests are carried over dial-up or dedicated 9.6K bit/sec links to a mainframe in San Diego.

That mainframe selects the best vendor for the purchase from a list of preapproved suppliers and sends out an EDI purchase order. Currently, orders are sent out once a day using McDonnell Douglas Corp.'s EDI*Net service. In the near future Pacific

(continued on page 32)

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Advanced Communications Technology Based on a Commitment to America and our Customers.

At Siemens, our commitment is to produce leading-edge communications technology, for America and all our customers.

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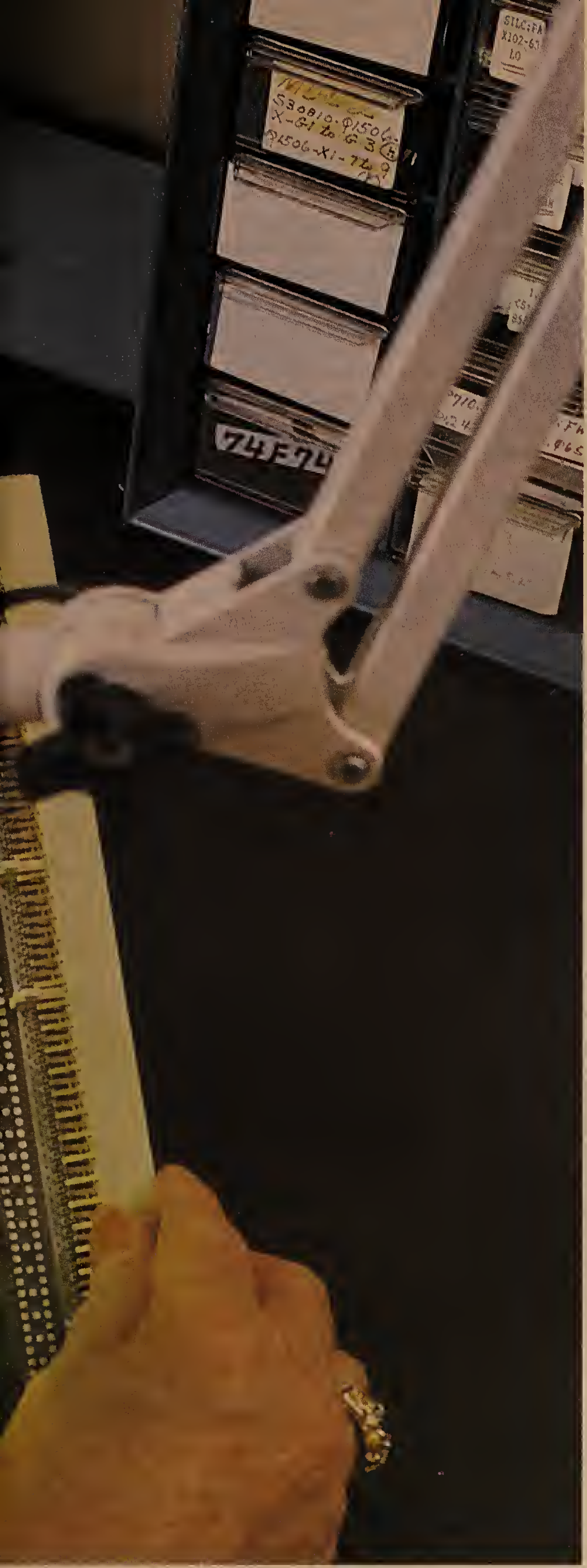

Quality Manufacturing in U.S.A.
The EWSD™ switching system is manufactured at our Hauppauge, New York facility. The plant is designed to provide a productive and efficient environment to ensure maximum product reliability, precision-engineering and timely deliveries.

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Innovative communications technology begins with a strong commitment to Research and Development. Our U.S. R & D staff numbers over 550 engineers, dedicated to the development of innovative software solutions for our customers' intelligent networks.

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The EDX-P packet switch is manufactured in Cherry Hill, New Jersey. Other packet data switching products are manufactured at Hauppauge, New York. More than 30% of the systems manufactured here are exported from the U.S.

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2-379-006-9A (2564)

PacBell's use of EDI helps trim expenses

continued from page 29

Bell expects to send out purchase orders four times a day (see graphic, page 29).

Electronic invoices are delivered back to the carrier over EDI*Net.

By the end of September, Pacific Bell was handling about 58% of its purchase orders and 72% of its invoices via EDI. The carrier is asking all of its vendors to commit to EDI and hopes to have 90% of its invoices and purchase orders handled electronically by the end of 1991.

Difficult job

According to Yacura, one of the most difficult parts of the project was persuading Pacific Bell's suppliers to participate.

"When we started, we found that only about 10% of our vendors had even heard of EDI," said Mary Olivas, Pacific Bell EDI manager.

Yacura said Pacific Bell has held several seminars explaining EDI and its benefits to its suppliers. He said the carrier holds weekly meetings with vendors to make sure they continue to work toward implementing the technology.

According to Raymond Wetteland, director of procurement systems at the carrier, persuading vendors to implement EDI will grow more complicated when Pacific Bell integrates EDI with electronic funds transfers. He said the carrier plans to do that over the next year, in part to trim accounting labor costs.

Electronic funds transfer payments will be triggered by the mainframe that handles EDI and purchasing applications. This mainframe will match invoices and receipt-of-delivery notices with purchase orders. If no discrepancies are found, a notice for an electronic funds transfer payment will be sent over a dedicated or dial-up link to Pacific Bell's bank. That bank will then transfer the money via bank electronic funds transfer nets to the supplier's account.

"The problem with [electronic funds transfer] is that you lose the float you have when checks are sent through the mail," Wetteland said.

According to Wetteland, Pacific Bell is working with its vendors to renegotiate contracts to reflect the savings they will experience by receiving payments more quickly through electronic funds transfer. ▣

Selling management on voice messaging

continued from page 29

formation systems department. The information systems group was chosen because it is generally more receptive to using technology, Taussig said.

The pilot enabled Taussig to iron out kinks in the system and monitor the way in which it was used. This helped him understand how best to present the system to other employees in the company.

After the pilot, Taussig approached each of the 50 executives with a request for a 15-minute appointment to demonstrate the system and its use. To Taussig's surprise, most of the sessions lasted 30 to 45 minutes, and most executives wanted to know how quickly they could get on the system.

After seeing the benefits the system could provide, almost all executives signed up, even those who initially resisted the idea.

Taussig then formally invited the staffs of each executive who subscribed to the system to attend a hands-on training session. "We knew that people wouldn't hesitate to subscribe if they knew their bosses had voice messaging," Taussig said.

Colgate-Palmolive's Mike Taussig

The sessions, which were given four times a day, were limited to 10 people and lasted an hour. Each session covered the features and usage of the system. People weren't given access to the system until they attended a training session.

Response from users was almost overwhelming. Taussig purchased a system that could support about 400 users but quickly had to upgrade it. The system now supports about 800 users, or 80% of all staff in the headquarters building.

Credibility is key

The implementation was not without its problems, however. Many workers began using the system as a convenient way to avoid answering the phone, Taussig said. As a result, it became necessary for the company's chief operating officer to issue a companywide policy that stated users should make every effort to answer their phones.

Taussig complemented that policy by rigging the voice system with an escape mechanism that enables callers to switch their calls to an operator or a phone station that does not have a mailbox.

These adjustments were needed to ensure that employees used the system the way it was intended to be used.

"The credibility of any [interactive] system relies 100% on the users and the way they choose to use the system," Taussig said. ▣

So much hangs in the balance.

In this business, you can't afford surprises.

Meet Colleen Auchter. Student balloon pilot and Telecommunications Manager for Wang Financial Information Services.

If there's one thing Colleen has learned from her ballooning experience it's this: Be prepared for anything. Anticipate the unexpected. Because when you're thousands of feet in the air, you simply can't afford any surprises. You have to be able to rely on your decision-making skills . . . and your equipment.

The same holds true in Colleen's job at Wang Financial. The decisions she makes in selecting a private-line vendor are absolutely critical. Especially when you consider that Wang Financial uses private lines to supply money managers, banks and brokers with real-time stock market information. At any given moment, vital information that translates into multi-million-dollar transactions is crossing the lines through Wang Financial's SHARK® service. And if there's an interruption in transmission . . . well, that's serious trouble.

Obviously Wang Financial's customers demand consistently reliable service. Wang Financial, in turn, demands the same from **Williams Telecommunications Group (WTG)**. And gets it.

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The fact is, no other company sets higher standards for availability than WTG. But in Wang Financial's business, where data transmission is critical, they must take every precaution. And that means back-up systems. Just in case. So Colleen counts on WTG to provide Wang Financial with route diversity as well.

"Buying multiple circuits from WTG is efficient and economical," Colleen says. "WTG has the route diversity Wang Financial needs."

So if you're still up in the air about which telecommunications vendor to choose, call WTG at 1-800-642-2299, or your local WTG sales office, and ask about our new route diversity offering for your voice, data, or video private-line services. No other company gives you a higher level of service.

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Association Watch

continued from page 29

Featured speakers will be Mike Lackey, president of DTE Systems Design, a consulting firm in Kings Park, N.Y., and Mike Rosen, director of corporate sales support for NEC America, Inc. in Melville, N.Y.

The meeting, which will run from 9 a.m. to 11:30 a.m., will also preview developments in telecommunications and office automation that are expected to occur in the 21st century.

For more information, call (516) 269-6713 or (212) 643-8579.

The **Communications Managers Association (CMA)** is holding its annual conference and exposition Nov. 28 to 30 at the New York Hilton Hotel.

"Telecommunications: Changing the Way We Live and Work in the '90s" will feature more than 30 seminars and tutorials on voice and data networking issues. It will be presented by users, consultants and vendors. The cost of the three-day conference is $225 for member companies and $250 for nonmember companies.

For more information, write to the CMA Annual Conference, Suite 300, 655 15th St. N.W., Washington, D.C. 20005, or call (202) 639-5161.

The **Canadian Business Telecommunications Alliance (CBTA)** recently announced support for an amendment to Canada's 1906 Railway Act that would make three provincial telephone companies subject to federal regulation. Currently, a technicality in the Railway Act exempts Alberta Government Telephone, Saskatchewan Telephone Co. and Manitoba Telephone Systems from federal regulation.

The amendment would put the Canadian Radio-television and Telecommunications Commission in charge of regulating public and private companies that provide telecommunications services in Canada.

The CBTA, an association representing Canada's business telecommunications users, said the lack of a unified telecommunications regulatory environment has created a hodgepodge of rules and regulations that hampers business activity.

The amendment is currently before Canada's House of Commons. Passage by the full legislature is expected in early 1990, according to the CBTA's legal counsel. ☑

Executive Briefs

continued from page 29

look to hire from the outside when they need to move quickly on a new project.

"Sometimes you don't have the luxury of training internal people, and you have to call a headhunter to find someone who can hit the ground running," said Bob Knapp, network manager for Shearson Lehman Hutton, Inc. in New York.

If a suitable candidate can't be found right away, Shearson Lehman Hutton will bring in a consultant to perform the work, he explained.

Knapp said it's most difficult finding LAN managers who have experience administering a net of several hundred personal computers and a dozen or so file servers. These professionals must have extensive experience with personal computers, as well as minicomputers and mainframes.

"These people aren't the archetypal PC jocks you might have hired in the past," he said.

A large Canadian bank solves its staffing problems by administering 25 branch office LANs from a central location. This spares the bank from having to appoint a network specialist for each remote site.

Most of these LAN managers come from a group within the bank that manages the corporate wide-area net. These people have related experience that enables them to manage LANs with a modicum of additional training, according to a network manager who did not want to be named.

"The bank has people with networking experience," the manager said. "It's not hard to upgrade their skills from there."

Practicing what they preach. High-tech sales representatives spend a great deal of time pushing information technology. But until recently, they haven't spent much time using it, at least according to a recent report by the Boston-based consultancy Arthur D. Little, Inc.

The report, "Sales Support Tools Improve Productivity in the Computer Industry," states that the "sales function has lagged behind other corporate areas . . . in its use of automation." The report added that information systems vendors have been no exception to that rule.

Realizing this, several computer vendors have made major investments in new sales support information systems, the report said, and these investments are paying off handsomely for some of them.

According to the report, Digital Equipment Corp. is saving more than $100 million a year by providing sales representatives with tools such as product data bases, which can be accessed via videotex, and expert systems that help sales representatives bid properly configured systems. These savings stem from increasing sales representative productivity and decreasing bidding errors.

The report also said Hewlett-Packard Co. has nearly doubled the amount of time its sales representatives spend with customers by giving them laptop computers that support dial-up access to data bases of product and customer information..

The laptops decrease the amount of time spent retrieving information from the office.

However, the report notes that not every vendor has been this successful with its sales support information systems. For example, IBM's main sales support information system was criticized for being difficult to use and for having slow response times. ☑

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Next February, a major event in voice and data communications will take place in Washington, D.C. In just four days, you will be able to gather the latest, most up-to-date information on the fast-changing world of communications at the 12th annual Communication Networks '90.

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Selected by the Department of Commerce for the second year in a row to participate in its elite Foreign Buyer program, Communication Networks '90 will give you access to the entire world of voice and data communications technology. As one of the winners of our contest, you could win a free trip to this unique event.

Just send in the form to enter.

When you complete and return the form below, we'll make sure you get complete details on Communication Networks '90 as they become available. AND, we'll automatically enter you in our contest for one of these three prizes:

1. Free air fare, hotel and conference admission. As First Prize winner you will get round-trip airfare from your nearest major airport, three nights at the luxurious Grand Hyatt Hotel, free admission to three days of conferences and the exposition, plus your choice of one day-long, in-depth tutorial. Approximate total value: $1,875.
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Whether you win a prize or not, you win. You will get information on a conference and exposition that can give you the expertise you need to stay ahead of your competitors. Send in the form today, or FAX it to 508-872-8237.

Summary of Contest Rules

Entry Form must be filled out with *all* information requested and received at the address shown NO LATER THAN November 30th, 1989. One entry per person; one prize per person. No registration is required to enter, but if you win after you have registered, you will receive a full refund. Winners will be chosen at random and announced on December 15th, 1989. Decision of the judges is final. All residents of the continental U.S. and Canada 18 years or older are eligible, except employees of International Data Group, its agencies, affiliates or subsidiaries. Winners must consent to the use of their names and photographs in contest publicity.

For a copy of the complete contest rules, or a list of winners, send a self-addressed stamped envelope to Communication Networks '90, P.O. Box 9171, Framingham, MA 01701.

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List the five communications/networking topics in which you are most interested:

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What makes you think
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NOW—THERE'S A SIMPLE TESTING TOOL FOR TEMPERING THE NETWORKING PROBLEMS THAT ARE THREATENING YOU WITH ENERVATION, EMBARRASSMENT AND EVEN UNEMPLOYMENT.

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It's simple to install.
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And when you're planning a change, how do you know
what the impact is going to be on the existing users?
Unfortunately, the only way is to try it—
and you may not like it.
Wouldn't you prefer to try change before you make it?

When a user calls the Help Desk with response time problems,
wouldn't you like to know
whether the problem is network- or application-related—
and the exact **ROUND-TRIP NETWORK RESPONSE TIME?**

And if it is network-related, then you need to
localize the problem—like an overloaded controller.
But wouldn't it be better to stress test it before you overload it?

Worst-case demand expectations (and the desire to sell more hardware)
lead vendors to set their capacity limits low...
so **CAPACITY PLANNING** is too often guesstimation, not calculation.
How can you check those specifications and push their limits
in a laboratory environment?

But equipment specified to work today can fail tomorrow's demand—
and once you've implemented your network,
you need an expeditious way to perform routine preventative maintenance
by stress testing your critical network components regularly.

Hopefully, your ongoing get-well program continually approaches
NETWORK OPTIMIZATION. The prime concern is
the quick restoration of acceptable response times.
But O.K. network availability is one thing, optimal is another.
To achieve the optimum, somehow you must fine-tune.

Both optimization AND restoration after system failures depend upon
your ability to somehow recreate the problem "in the lab"
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When disaster strikes, the critical objective of any strategy
is the rapid restoration of service—not only to plan it,
but to be able to implement that plan immediately.
Simply being able to bring up the backup data center isn't enough—
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Restored service to users must work flawlessly—
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When users aren't getting acceptable turnaround from the network,
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The networking name of the game is **IMMEDIATE USER ACCOMMODATION.**

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NETWORK MANAGEMENT
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"To move our data center to another state, our entire network, with over 2,000 users worldwide, had to be redesigned and reinstalled. NetTester allowed us to fully stress test our entire network as we installed it before the applications were ready—and our network was 100% available for the 12 months following the move."

—Network Hardware Manager
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HELP DESK: ROUND-TRIP RESPONSE TIME

"When users called about problems, we had difficulty determining whether the problem was network related. So, calling the wrong people to work on problems caused serious delays in resolving user complaints. With NetTester, we can determine in minutes—while the user is on the phone—if the problem is network related. And our problem resolution time has dropped by half."

—Customer Relations Manager
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VENDOR SPECIFICATIONS EVALUATION

"We were preparing to buy more backup equipment. We had ordered $200,000 worth of more network equipment to support increased capacity needs, based on the vendor's recommendations. Then we used NetTester to check practical capacity. Although the additional equipment had already been shipped to us, we shipped it back. NetTester proved we didn't need it."

—VP, Data Communications Engineering
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OPERATIONS MANAGEMENT: PROBLEM ISOLATION

"For months we had been trying to get an international X.25 network to run clean. Every time it went into production, we had a problem. With NetTester, we were able to isolate and resolve our problems overnight. Now we stress test every link before we put it into production. Before NetTester/1, it was taking months to certify each link. Now it only takes hours."

—Senior VP, Data Communications
A Multinational Banking Institution

DISASTER RECOVERY: FIRE DRILL

"We took several months programming PC's to act like users. Then we installed 50 rented PC's in our data center for an entire weekend. We originally only used NetTester/1 to assure connectivity of the PC's with our disaster recovery site. Since then, we've realized that testing of every device and all network components with NetTester/1 alone was all that was necessary."

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USER INTERFACE/PRODUCTIVITY ENHANCEMENT

"Our network was failing two to three times per week at the peak hour of usage. User frustration was rising; sales and commissions were being seriously affected. Within 30 days after we began stress testing with NetTester, we were running clean. NetTester has significantly improved our network group's relations with the users and increased productivity overall."

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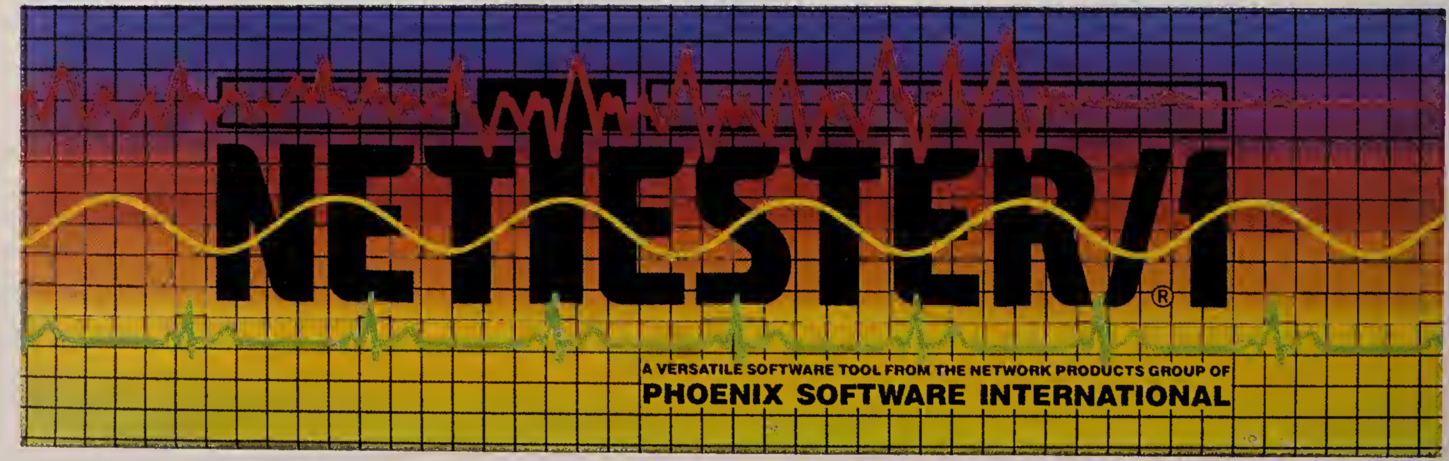
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O.K., LET ME TEST YOUR NEW TESTER.

Here are the facts about my basic networking environment:

MVS Version: ☐ SP ☐ XA ☐ ESA

VTAM Version:__________

Number of Online Users:__________

The type of media I need is:

☐ 6250 BPI Tape

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My current areas of NetTester/1™ application interest include:

☐ Change Assurance: Reconfiguration and Data Center Relocation

☐ Help Desk: Connectivity Checking and Network Response Time

☐ Empirical Capacity Measurement and Benchmarking

☐ Vendor Specifications Evaluation and Cost Control

☐ Operations Management: Problem Isolation

☐ Network Optimization: Response Time Analysis, Stress Testing and Fine Tuning

☐ Disaster Recovery: Fire Drill and Mobilization

☐ Improved User Interface and Productivity Enhancement

My network responsibility is best described as:

☐ Network Hardware Manager
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  ☐ Network Operations
  ☐ Help Desk
  ☐ Network Services
  ☐ Disaster Recovery

☐ Network Software Manager
  ☐ Program Support
  ☐ New Comm Applications
  ☐ Comm Access Methods Programming (VTAM, Etc.)
  ☐ Network Performance Evaluation

AND—I am responsible for evaluating and selecting products like **NetTester/1** for use at my company.

I agree that I will install, test and use **NetTester/1** for one full month AT NO CHARGE.

At the end of that 30-day free trial, I agree that I will complete and return the **NetTester/1** Evaluation Form…

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I will either return my **NetTester/1** to you with no further obligation

OR recommend its lease or purchase to the appropriate Purchasing Authority.

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NW 11/6/89

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We're offering you the chance to check out **NetTester/1** for yoursel

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At the end of the 30 days, all you have to do is:

1) give us your candid opinion about the usability and functionality of **NetTester/1**

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2) either return your **NetTester/1** to us

OR recommend its lease or purchase.

AND—for your cooperation in helping us with our test-marketing of **NetTester/1**, we'll give you an introductory discount—if you sign up for our **NetTester/1** Evaluation Program **BEFORE DECEMBER 31, 1989.**

That's all the catch there is. O.K.?

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Worth Noting

Next week: A *Network World* Buyer's Guide takes a look at what's happening in today's Ethernet LAN market.

First Look

Hybrid Fax unveils fax transmission pack

Hybrid Fax, Inc. next week will unveil facsimile transmission software that enables personal computer users to transmit files as fax documents without internal fax hardware.

The software, **JetFax/PC,** works in conjunction with JetFax, a stand-alone hardware device that connects a personal computer to a laser printer and enables that printer to be used for incoming faxes.

In addition to eliminating the need for a telephone line to personal computers outfitted with a fax card, JetFax/PC requires no additional ports because it operates over the same printer port the personal computer uses to send files to the laser printer.

With JetFax/PC, users send faxes to JetFax as if they were print files. Those files can be sent immediately or stored for later transmission. Users can send the same fax to multiple recipients by grouping recipients under a single destination in the phone directory.

JetFax/PC can transmit ASCII and Tag Image File Format files, and it can support mixed types of files on a single document. Letterheads and signatures, for example, could be merged with documents that are being faxed.

For a stand-alone personal computer, JetFax/PC costs $195. A site license for an unlimited number of personal computers, each running a copy of the software, is priced at $395.

The product will be available in January 1990.

Hybrid Fax, Inc., 1733 Woodside Road, Suite 335, Redwood City, Calif. 94061; (415) 369-0600.

LAN server gets TCP/IP, X.25 support

By Tom Smith
New Products Editor

NEW YORK — Datability Software Systems, Inc. recently introduced several network interfaces for its Vista Communications Platform (VCP) 1000 network server that increase the number of transport protocols supported.

The new products add X.25 and Transmission Control Protocol/Internet Protocol support to the VCP 1000, which had previously only supported Digital Equipment Corp.'s Local Area Transport (LAT) protocol.

The new products include an Ethernet network interface card to connect TCP/IP nets to the server, as well as a second interface that supports both TCP/IP and LAT protocols.

The company plans to add a token-ring interface within a month, according to Ron Howard, president of Datability Software Systems.

The company also rolled out several line interface cards, which connect subnets to the server. The new line cards include an X.25 gateway, a dual-protocol converter card that translates between TCP and LAT, and a modem card that supports both TCP/IP and LAT. The company previously offered eight-port RS-232, 16-port RS-423 and 32-port RS-423 line cards.

The new TCP/IP Network Interface Card enables TCP/IP networks to connect to the VCP 1000 server for the first time. The card can support as many as 128 TCP/IP sessions and will be available in December for $1,200.

The other new network interface is the dual-protocol TCP/IP-LAT Network Interface Card, which enables users to communicate in both TCP/IP and LAT on the same network. The TCP/IP-LAT Network Interface Card costs $1,600 and will be available during the fourth quarter.

The TCP/IP-LAT Network Interface Card works in tandem with the new VCP/LC-NPT translator line card. The translator enables existing TCP/IP servers for the first time to access LAT data and vice versa.

The VCP/LC-NPT, which resides in the VCP 1000, supports up to 16 simultaneous interprotocol sessions between any TCP/IP or LAT server.

"Right now, there are approx-

(continued on page 36)

Videoconferencing codec sets market price point

DALLAS — Concept Communications, Inc. recently introduced a coder/decoder (codec) for full-motion videoconferencing that it claims is dramatically less expensive than products from other vendors.

The codec, TeleTRAVLER, operates at fractional T-1 bandwidths of 384K and 768K bit/sec and costs $5,995. Codecs offering similar functionality to the TeleTRAVLER cost approximately $30,000, according to Van Chandler, president of Concept Communications.

"Most American companies have converged on a price of around $30,000 for a 56K to 384K bit/sec video codec," agreed Elliot Gold, president of TeleSpan Publishing Corp. of Altadena, Calif., which has two publications dealing with teleconferencing.

TeleTRAVLER achieves its economies of scale by using a statistical video compression algorithm that is less computationally intensive than other commonly used techniques, such as vector quantization. Reducing the amount of processing required enables the company to use fewer components, resulting in cost savings for users.

Chandler declined to detail how the proprietary algorithm works, but he said it reduces the amount of processing required by about 100 times.

The codec has two custom chips to convert video signals to digital signals — one for compression and the other for decompression. Competing products typically compress video on components that take up three or four circuit boards, Chandler said.

TeleTRAVLER takes incoming video signals from a camera and compresses the signals down to 384K or 768K bit/sec, depending on the transmission channel to be used. At the receiving end, the signal is decompressed and the image is displayed on the user's monitor.

Two characteristics for measuring the quality of the video signal are resolution and frames per second, Chandler said.

TeleTRAVLER offers screen resolution of 256-by-200 pixels, a figure Chandler said is about 80% to 85% as good as competing products. "We decided not to display that many more pixels be-

(continued on page 36)

C. Itoh unveils new X/Windows terminal

CIT-X will eventually support DECwindows; firm integrates Ethernet support into Tiger terminals.

By Tom Smith
New Products Editor

IRVINE, Calif. — C. Itoh Electronics, Inc. recently introduced a network display station that supports the X/Windows and Digital Equipment Corp. DECwindows environments.

The company also unveiled an upgrade to its DEC-compatible Tiger graphics terminals, allowing them to be connected directly to Ethernets.

The CIT-X Network Display Station is a diskless workstation that connects to Unix-based computers in Ethernet local networks.

It performs all graphics manipulation locally and off-loads the bulk of applications processing to a server. It will initially be offered for the X/Windows environment and later for DECwindows.

According to Marc Liebesman, vice-president of marketing for C. Itoh Electronics, the CIT-X is being positioned as a low-cost alternative to workstations priced at $10,000 to $15,000.

The terminal consists of a 15-by-15 in. color monitor that offers 1,280-by-960 pixel resolution and can connect directly to an Ethernet with its built-in interface.

The terminal has two on-board processors, a Toshiba Corp. 68301 main processor, which handles communications functions, and a Texas Instruments, Inc. 32-bit 34010 processor for X/Windows graphics functions.

The CIT-X Network Display Station comes with 512K to 2.5M bytes of random-access memory. It can process Transmission Control Protocol/Internet Protocol data and display it in an on-screen window.

The terminal also emulates Telnet terminals and offers a remote logon capability.

The terminal, which emulates DEC VT-52, VT-100 and VT-220 terminals, can be connected to Ethernets via thick or thin wire.

The terminal comes with a directory services capability that has a name server function, in which it asks hosts on the network to locate the IP addresses of unrecognized network nodes.

Once the host relays that data to the CIT-X, the terminal can route it to the node.

Available now, the CIT-X Network Display Station costs $2,795. A version that is also compatible with DECwindows will be available in the second quarter of 1990. Pricing will be set when that upgrade is introduced.

Tiger upgrades

The new Ethernet terminals, the monochrome CIT334ET and the color CIT344ET, are graphics terminals that can be connected concurrently to DECnet networks running Local Area Transport (LAT) and TCP/IP.

Users can purchase the new terminals with a built-in Ethernet interface or buy the interface as an upgrade to Tiger terminals, which are compatible with and positioned against DEC VT-330 and VT-340 terminals.

> The CIT-X is being positioned as a low-cost alternative to $10,000 to $15,000 workstations.

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With the Ethernet connection, the terminals can establish and maintain as many as 10 sessions at one time from any two LAT or TCP/IP hosts.

A user might, for example, call up a text editor on a VMS system while accessing a data base on an Ultrix system.

Like CIT-X terminals, the CIT-334ET and CIT344ET have a 32-bit TI 34010 graphics processor that makes them faster than their DEC counterparts in graphics applications, Liebesman said. A host on the Ethernet transmits data packets to the terminals at 10M bit/sec, overcoming 19.2K bit/sec throughput limitations inherent in terminal servers required by DEC terminals, the company said.

The terminals can display as many as 256 color combinations.

The graphics terminals will be available 60 days after receipt of order. CIT334ET costs $2,495, and CIT344ET is priced at $3,495. The upgrade kit, scheduled for delivery in the first quarter of 1990, costs $799.

C. Itoh Electronics can be reached by writing to 2505 McCabe Way, Irvine, Calif. 92714, or by calling (714) 660-1421.

Server gets X.25, TCP/IP support

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imately $500 million worth of DEC terminal servers in the market that only speak LAT, and about $200 million of TCP/IP-only terminal servers that can't speak LAT," Howard said.

The VCP/LC-NPT will be available in December for $2,399; the dual TCP/IP-LAT Network Interface Card will be available in December for $1,600.

The new VCP/LC-X.25 gateway is a board that fits into the VCP 1000 chassis, enabling local net users to connect to an X.25 packet-switched network to access data on other local nets. Remote users on a TCP/IP net, for example, can communicate with the local TCP/IP net supported by the VCP 1000. The X.25 gateway supports TCP/IP and LAT.

Up to 64 users can connect to the X.25 gateway, which can support line speeds of 64K bit/sec.

The Datability card offers advantages over other X.25 packet assembler/disassemblers, Howard said. Other vendors require users to route the X.25 data to a terminal server attached to the VCP 1000. That terminal server, in turn, splits the X.25 circuit into individual asynchronous connections for each terminal.

According to Howard, Datability's VCP/LC-X.25 eliminates the terminal server by connecting the terminals directly to the net interface in the VCP 1000. The X.25 gateway will be available in December for $3,199.

The VCP/LC-8-2400B Modem Line Card has eight on-board 2,400 bit/sec Hayes Microcomputer Products, Inc.-compatible modems and supports TCP/IP and LAT protocols. Because VCP 1000 can hold up to four line cards, a server chassis with four VCP/LC-8-2400B Modem Line Cards can replace 32 individual modems, as well as the individual cabling that would otherwise be required for each of them. VCP/LC-8-2400B will be available in December for $2,999.

Datability can be reached by writing to 322 Eighth Ave., New York, N.Y. 10001, or by calling (212) 807-7800. ◼

If you thought single-line voice/data communications were way out of your league, check the latest score: Carriers have *slashed* the cost of Switched 56 service. This is your best time to put in a heavy hitter – TieLink 56, from Kentrox.

This UL-listed network interface – *now at a reduced price* – lets you send digital data at 56 kb/s through the switched network. TieLink 56 can automatically dial up to 21 stored numbers. It translates data into network-compatible signals, and performs diagnostics.

TieLink 56 meets all carrier specifications and uses industry-standard "AT" commands. Available in desktop and rack-mounted models, TieLink 56's handy front-panel keypad lets you select your own data rates, from 56 kb/s to 2,400 b/s, and define call set-up parameters.

The versatile TieLink 56's patented 2100-Hz tone feature disables echo cancelers for clean data transmission.

TieLink 56 can be your most valuable player in the *new* game of Switched 56 communications – at a price that's in your ballpark.

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See the FAXNeT Form on Page #58

Codec sets mart price point

continued from page 35

cause we felt what we've achieved is a very acceptable video quality for virtually any application," Chandler said. He claims that Concept Communications' frame/sec rate of 30 is double that of competing vendors.

Although these parameters are typically used to measure a codec's video quality, it's more important for users to determine if the picture quality is acceptable, according to Gold. "I think their numbers are terrific, but the picture is in the eye of the beholder."

The codec has a toll-quality audio processor on the same circuit board as the video processors that compress 64K bit/sec pulse code modulation (PCM) voice signals down to 32K bit/sec using adaptive differential PCM.

Concept Communications will also sell full videoconferencing packages that include a JVC America, Inc. TK-885U camera, a 19-in. monitor (for which the company has not yet selected a vendor) and an NEC Corp. VoicePhone speakerphone. The peripheral package costs $3,500.

Chandler said the product will be targeted at users with installed private T-1 networks as well as entry-level users.

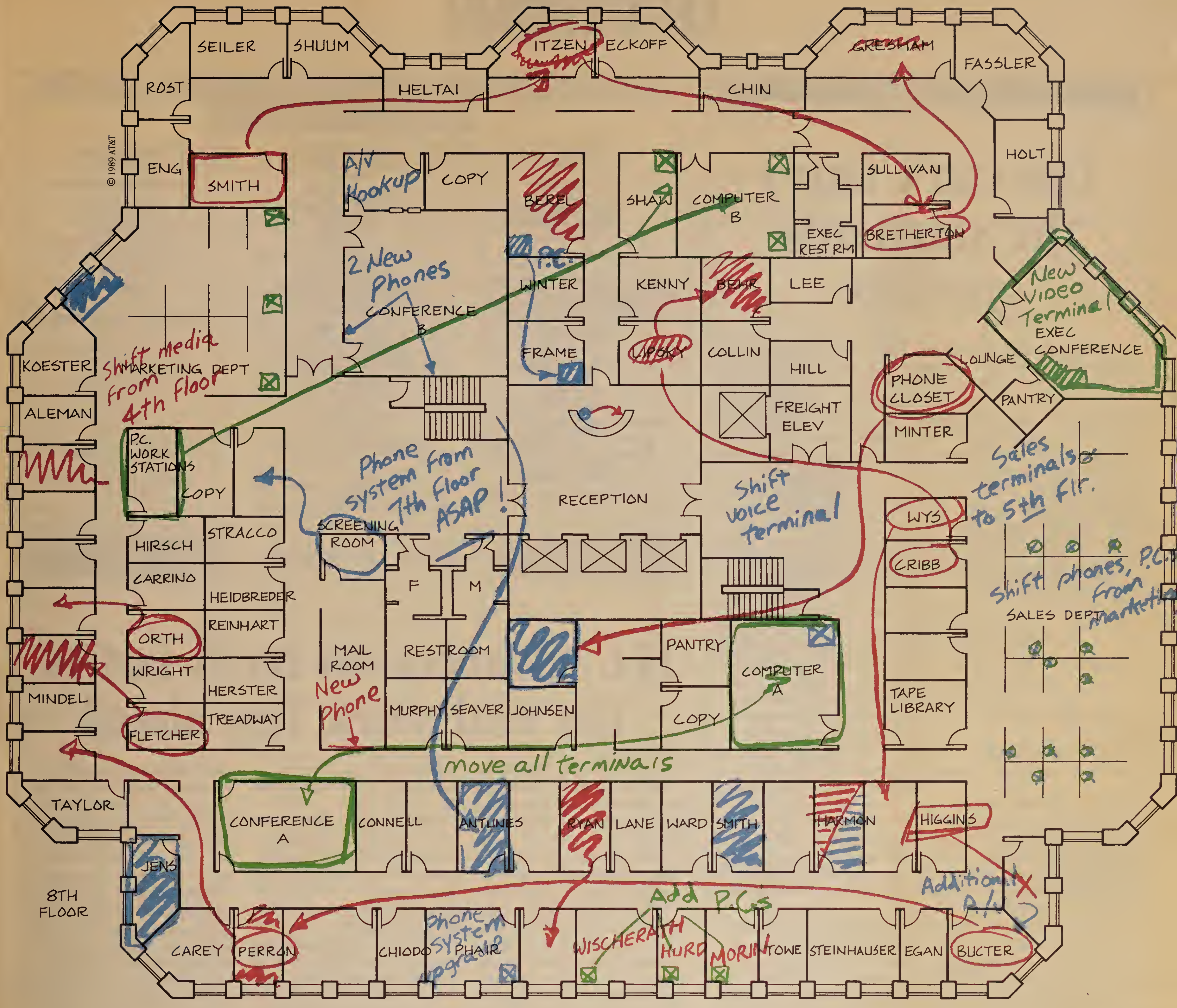
"Right now, we're dealing with this culture change of getting people used to thinking about video as a way of communicating as opposed to hopping on a plane every time they need to have a meeting," he said. "This is an extremely cost-effective way to prove video's viability within an organization."

"[Concept Communications] believes there's a market for the low end and I think that's right, but I don't believe any manufacturer will find a market at any end of the spectrum for low quality," Gold said.

Ruth Gardner, industry analyst at Dataquest, Inc., a consultancy in San Jose, Calif., echoed that sentiment. "The real issue in teleconferencing is quality," she said. "Quite frequently, you'll see that a lower price means the picture quality is lower, too."

TeleTRAVLER is available now.

Concept Communications can be reached by writing to 1950 Stemmons, Suite 4308, Dallas, Texas 75207, or by calling (214) 746-3888. ◼



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STANDARDS

BY C.D. WARREN

You can't hurry the standards process

Any standard is a compromise. That is the purpose of a standards body: to reach a compromise. There is much give-and-take. Not all proposals have technical merit for the entire community of technical developers and users. And while users often have the biggest voice, they often get shouted down because they frequently aren't cognizant of the technical issues.

Standards are the codification of current practice. They come about in two ways. The first way is for an industry leader to establish a methodology that provides a solution. The process is de facto and often is codified by a standards body. In most cases, this adds much value to the basic specification.

The second way is for a standards body to work on a virgin area. If the area chosen has little merit or market impact, the standard will founder. But that does not happen often. A good example of a standard in transition is Integrated Services Digital Network. This standard is the supra (eighth) layer of the Open Systems Interconnection model, representing control, users and management of the network and information on the network. This standard requires a communications framework; thus, existing standards play a role. Technology issues are paramount. The artisans who are sculpting the standard are chartered to resolve interconnection problems and ensure a homogeneous appearance in a diverse network.

> A standards specification isn't a designer's guide to building a product.
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But the standard's codification appears slow. As early as 1984, manufacturers were claiming conformance to ISDN. The notion of its purpose was new at that point, and how ISDN would function within a large landscape wasn't well defined.

The point is that companies were willing to put a stake in the ground. At any time during a standard's development, a company can establish conformance. One has to be aware, however, that the specification will change. In most communications standards, the changes usually are not devastating — the basic functionality and rules stay the same.

A standards specification isn't a designer's guide to building a product; it is the rule book on how to create the designer's guide. Thus, standards don't inhibit creativity or stifle innovation; they ensure industry interoperability.

Think about what communications implies: the exchanging of information. For example, *Network World* is written in English not only to ensure that information exchange takes place, but also that readers have a high probability of understanding the articles. If *Network World* was written in Senegalese, only people like my friend Emile would be able to read it and its market would be quite narrow.

We can establish an effective communications network with two soup cans and string. You can probably remember from your childhood that waxing the string increased the voice quality and thin buttons worked better than fat buttons as the end termination in each can. This was a form of standardization, but those standards didn't come about overnight. It took lots of soup cans and lots of children to codify the technique.

Five years in development is a drop in the bucket when you consider the outcome of a finalized standard. For example, the X.400 standard is making it possible for McDonnell Douglas Space Systems Co. to establish a robust communications network. Without the standard, we may not know to wax the string.

Warren is a senior engineer in the space station division at McDonnell Douglas Space Systems Co. in Huntington Beach, Calif.

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EDITORIAL

FCC advances on tariff issues, but real work lies ahead

If you thought there was a flurry of activity on the custom network front in recent months, just wait. You ain't seen nothin' yet.

The Federal Communications Commission two weeks ago gave AT&T the green light on Tariff 12 and did nothing to prevent the carrier from making wider use of Tariff 15, a custom net tariff that has seen less action than its more widely publicized sibling.

For big users, the FCC's ruling was good news.

It is certain to spark even hotter competition among the Big Three long-distance carriers for the business of major users. AT&T says it's ready to move even more aggressively in the custom net arena, promising to expand rapidly the number of Tariff 12 users and to file new Tariff 15 deals.

AT&T's rivals will be forced to keep pace, and savvy users will likely be able to secure some impressive network deals by playing the carriers against one another.

The decision not to prohibit AT&T from offering Tariff 12 deals removes a large measure of the uncertainty that has surrounded the custom network arrangement since its inception in 1987.

Technically, the FCC had already given the go-ahead to Tariff 12 in April, but protests by AT&T rival Williams Telecommunications Group, Inc. (WTG) and the Independent Data Communications Manufacturers Association (IDCMA) had muddied the Tariff 12 waters.

(One obstacle remains, however: The industry awaits action on a suit filed by MCI Communications Corp., US Sprint Communications Co., WTG and the IDCMA seeking a reversal of the FCC's April ruling.)

While it apparently has closed the book on the Tariff 12 debate, the FCC neatly sidestepped a decision on a very sticky question raised by Tariff 15 — whether AT&T, the only dominant long-distance carrier, can offer customer-specific, off-tariff pricing.

> The FCC didn't address the off-tariff pricing issue, nor did it prevent AT&T from filing new Tariff 15 arrangements.
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The agency rejected AT&T's first Tariff 15 deal on a technicality. However, the FCC didn't address the off-tariff pricing issue, nor did it prevent AT&T from filing new Tariff 15 arrangements.

A decision on the customer-specific issue may have to wait for the results of another FCC investigation, news of which was perhaps the most important thing to come out of the FCC's Oct. 26 meeting. The agency says it plans later this year or early next year to begin an investigation into competition in the long-haul marketplace — an investigation that could ultimately lead to major changes in the way AT&T is regulated.

Depending on the outcome of this proceeding, which will examine AT&T's status as a dominant carrier, AT&T may be given wide freedom to move without FCC approval.

This investigation is an absolute necessity.

Given the major changes the long-distance market has witnessed in the past five years, the FCC must reexamine the principles by which it regulates AT&T. Simply put: Should AT&T be held to different standards than other carriers?

Without such a fundamental reassessment, the agency is forced to rule on each AT&T initiative and each challenge to those initiatives. Worse, users are forced to endure lengthy FCC proceedings before they know with any certainty what AT&T will be permitted to do.

The FCC must undertake its competitive market examination soon and wrap up the proceeding in a timely fashion. In the absence of that, confusion and bureaucracy may stifle innovation and competition in the long-distance market.

OPINIONS

SERVICE PROVIDERS

BY MARY JOHNSTON

Internal consulting can be key to corporate success

The role of corporate communications and computing providers is defined very differently across corporations and across industries. Their relationship to end users can vary from advisory to adversarial.

As communications and computers permeate every facet of corporate existence in the 1990s, provider organizations must reevaluate and update the ways in which they interact with end users. The confluence of many independent trends in communications and computing is setting the stage for significant changes, not only in the way businesses and naive end users think about networking, but also in the types of support they require from their internal service providers.

Consider the following developments and their possible impact on corporate computing and networking:

- The rise of object-oriented programming.
- Improvements in digital image and digital video compression technologies.
- The increased availability of switched digital nets and Integrated Services Digital Networks.
- Increased availability and sinking costs of intelligent workstations.
- Movement of computer-aided design and manufacturing beyond traditional engineering applications.
- The popularity of desktop publishing and compound document generation.
- The rise of facsimile machines, setting instant communications as the standard.

The result of these developments is that greater computing resources are being put into the hands of technically inexperienced users. A further implication is that naive users will have more influence in technology purchases and strategic directions. Notoriously the victims of slick vendor presentations, ingenuous users rarely have the background to evaluate purchases in a corporate context.

In the past, the needs of research and development dominated high-performance networks. But this position may soon be taken over by sales and marketing, which strive to gain market share via electronic graphics-oriented help lines and customer contacts, or purchasing and finance, which cuts checks and issues invoices electronically.

> Net managers should set standards and develop workable security policies.
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Users cheer the rise of friendly interfaces and low-cost desktop computing in the hopes that these developments will make users more competitive and more productive. However, network managers and computer application developers shudder at the implications.

Instead of having to support a small group of technically advanced users, hundreds of nontechnical users may flood the help desk with requests.

The rise of desktop computing has been difficult to monitor, let alone control, and the thought of building standards to satisfy all users is overwhelming to network managers. To mask the complexities of network access, applications of the 1990s will require customized user interfaces. Data bases will have to be constructed to support distributed computing and widespread access.

Connections to the outside world will be required, raising issues of security, as well as connectivity standards. Forecasting bandwidth and switching requirements for local- and wide-area network resources will become even more difficult as the sources of input to the nets multiply and the volume of bits increases by orders of magnitude.

Luckily, it will take several years for the above scenarios to develop. Communications and computing departments can begin getting ready today for the inevitable.

Instead of resisting outside connections, today's net managers should set standards and develop workable security policies. They can identify key communications architectural modules and develop migration plans toward higher bandwidth and faster switching capabilities.

Most of all, they must take on the role of a technology consultant and keep in touch with the end-user base. Regular technology transfer meetings between service providers and end users can promote a common understanding of where business requirements are going and how communications and computers can foster that development.

The corporate goal is to be profitable and successful. Nontechnical decision makers will need increasing levels of technical support during the next several years for their corporations to achieve those goals.

By providing a reliable in-house source of technical support and advice, the communications and computing providers benefit in several ways: They are forced to stay up to date on leading-edge technologies; they develop reliable information on user requirements before systems are actually needed; and they can influence user decisions, thereby avoiding investment in technologies that are incompatible with corporate technological directions.

Rapid changes in computing and communications are an opportunity for internal service organizations to rise to the occasion. Investment in staff and in research capabilities to support this role is well worth it to the users, the service providers and the stockholders. ◘

Johnston is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting collaborative specializing in management, communications and information strategies.

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TELETOONS

BY FRANK AND TROISE

Wouldn't you know it? No sooner do I work out the Disaster Recovery Plan and..bingo! Something new pops up..

LETTERS

GM clarifies ISDN issue

In response to your Oct. 23 editorial "If GM doesn't get its way, it will take its ball and go home," we would like to clarify any confusion created with respect to the activities and actions of General Motors Corp. in the North American ISDN Users' Forum (NIU Forum).

GM and Electronic Data Systems Corp. have been involved in the NIU Forum since May 1988.

We participate in several user and implementer committees, championed the idea of Integrated Services Digital Network Version 1.0 functionality and worked in the Application, Demonstration and Testing committee of the forum.

In effect, one could say GM has made an investment in its ISDN future.

It is our firm belief that well-defined goals, achievement milestones and completion dates are essential to the success of any worthwhile endeavor.

GM functions today in a highly competitive environment and has derived applications that we think a technology such as ISDN can help us provide.

We are instilled with a sense of urgency concerning the timely availability of both ISDN and Open Systems Interconnection capabilities. At the October '89 NIU Forum meeting, our goal was to transfer our sense of urgency and gain a focus for the work of the committee-oriented NIU Forum.

To achieve multivendor implementation of standards-based technology, we firmly believe it is necessary to have an objective to strive toward. An ISDN interoperability event would be an ideal objective, leading to interoperable ISDN products that would ultimately provide the capabilities users require.

Your editorial recognizes that "GM may have some legitimate concerns regarding the NIU Forum's handling of the interoperability event and its progress in other key areas."

You do your readers a disservice to dismiss these concerns as simply organizational

More letters, page 57

Demarest

Radio days

CONTINUED FROM PAGE 1

held radio data-entry terminals have been available for years for applications such as bar code scanning in factory and warehouse settings. The terminals transmit to base stations that demultiplex the information and send it to a host computer.

Plug-in radio cards and packet radio peripherals for personal computers have been on the market since the mid-1980s. These products are gaining acceptance in dispatch mobile radio applications and in settings where ranges greater than 10 miles are required. They have not found wide use in indoor corporate LANs, however, probably because of constraints that also affect conventional hand-held radio data terminals.

Such terminals usually use narrowband radio technology to transmit data and are limited to rates of about 9.6K bit/sec. In addition, they require radio channels licensed by the Federal Communications Commission. Requests for channels must be processed by one of the trade associations representing the radio service that most closely matches the requestor's business type.

Kobb is editor of "Federal Communications TechNews," a newsletter published in Falls Church, Va., that tracks radio and technology affairs at the Federal Communications Commission.

Some of these trade associations are the Special Industrial Radio Service Association, the National Association for Business and Educational Radio, the Manufacturers Radio Frequency Advisory Committee and the Utilities Telecommunications Council.

The associations charge fees to recommend frequencies to the FCC for a specific applicant. This frequency-coordination process has long been criticized as unreasonably expensive and monopolistic, and it may be intimidating to the nontechnical manager.

Interference

Narrowband radio channels are shared among various types of users. The FCC will not assign these channels for a particular company's exclusive use, so the airwaves in metropolitan areas are often quite congested. Incompatibility and interference among users can result. Because unlicensed radio operation is growing dramatically, it can be difficult to isolate and identify interference sources.

One alternative is to use light as a medium rather than radio. The signal — voice or data — to be communicated modulates a light source, often a laser. The light travels through a plastic or glass cable or through the air. At the other end, a photosensitive device converts the light impulses into high and low voltages that represent information.

Wireless local-area networks can make the hassles of moves and changes a thing of the past.

Laser links enjoy wide bandwidth as well as secure communications and immunity to adverse weather conditions. Unlike some current radio systems, however, they require precise installation and cannot penetrate opaque media, such as walls. Metal walls can block and reflect radio signals and do not necessarily represent impossible obstacles to radio usage.

Another solution to the licensing and interference problem is to allocate some radio frequencies (RF) for the exclusive use of radio LANs.

With few exceptions, most of the electromagnetic spectrum believed to be suitable for radio-based LANs is used intensively by broadcasting, government, microwave and mobile communications services. As a result, one of the only options left for a new radio communications system is to share spectrum with some existing, compatible service.

Motorola attempted to do just that in a 1985 petition for rule making before the FCC. The firm proposed to nationally market a radio LAN product that transmitted on the 1.7-GHz band. This band has few terrestrial emitters, but it is home to a wide array of government weather satellites.

However, the government was concerned that proliferation of Motorola's product would result in objectionable interference to the satellite ground stations. Motorola failed to convince weather satellite users that it could easily remove installed radio-based LANs from service in the event of interference to satellites.

The company abandoned the plan, only to resume it in a modified form. Motorola now seeks to share microwave data and video service frequencies at 18 GHz for a Wireless In-Building Network (WIN).

The WIN scheme would allow special licensed carriers to install radio LANs on customer premises within specified geographic service areas. End users would not be allowed to hold licenses or install their own systems. The FCC is expected to decide by year end whether to permit Motorola to implement its proposal.

Fortunately, spread spectrum — a technology developed for military communications — is enabling low-power radio LANs to share scarce frequencies with

(continued on page 74)

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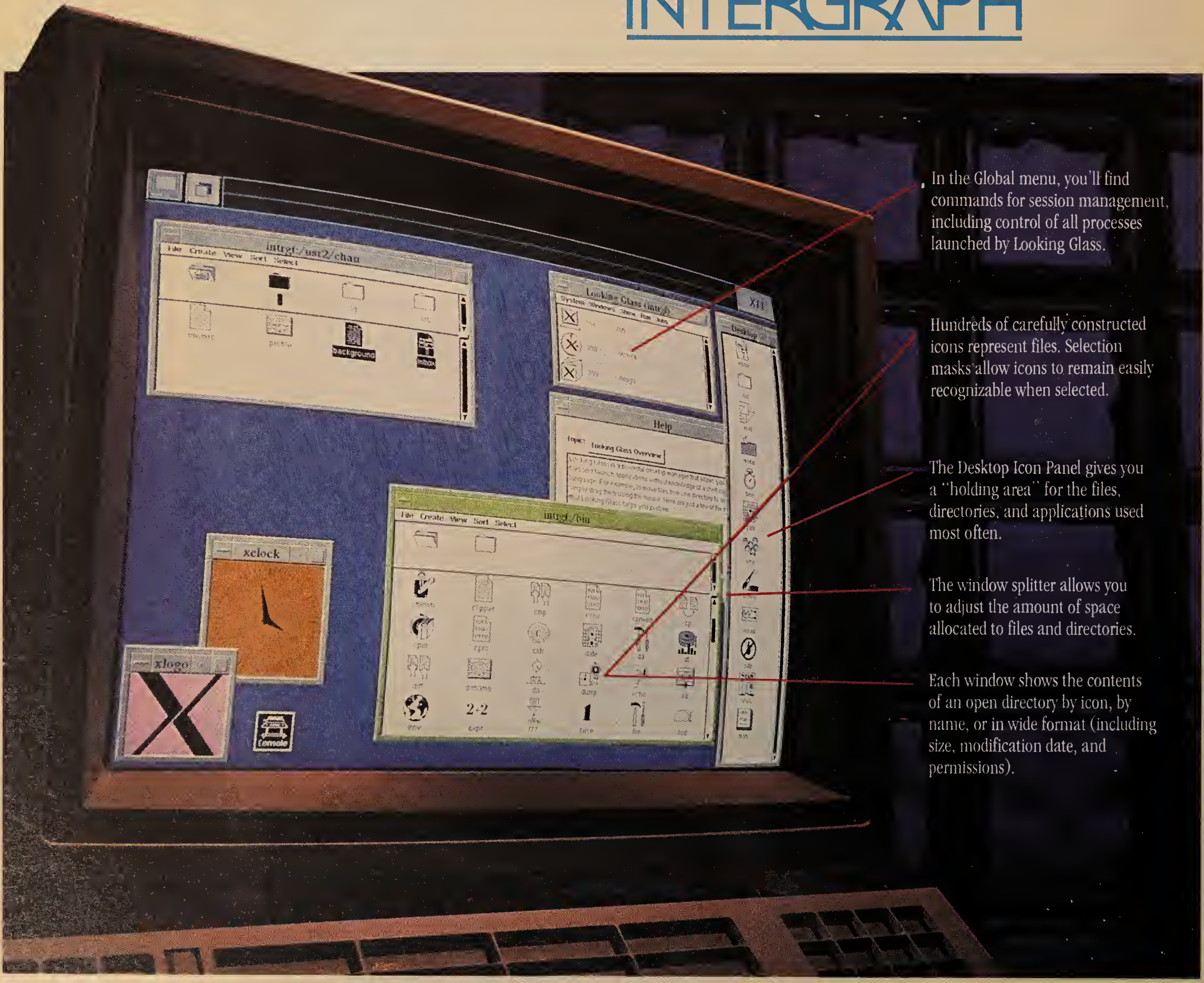

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Passing the test

Mid-range network testing equipment may not be flashy, but it can be a communications manager's best friend.

By BRUCE GUPTILL

The current emphasis on enterprisewide, any-to-any connectivity is good for American business. It means companies are acknowledging the importance of making information available everywhere it's needed, when it's needed. It brings deserved recognition to the efforts of communications managers, and it means business for the makers of network test equipment.

Since divestiture, the market for network test equipment has mushroomed. There are more carriers, and there is more equipment from more vendors. Even small user companies often have at least two carriers for long-distance traffic. Multiple service contracts covering various vendors' equipment make life a bit more secure in the long run, but the user has the responsibility to find out which vendor or carrier is at fault.

If you've got a mainframe in Cleveland linked to a local-area network in Michigan via a nonintelligent gateway over dial-up lines, the capacity for error is increased almost geometrically. You, as a manager, must be able to isolate the fault, locate the equipment or line responsible and prove your case to the vendor or carrier. That's where having the right network test equipment — and knowing how to use it — comes into play.

Three types of testers

The entire range of network testing hardware and software is

(continued on page 46)

Guptill is associate features editor for Network World.

CHART • GUIDE

- A chart comparing analog test equipment from a variety of vendors is on page 50.
- A second chart listing the features of various digital line testing products is on page 51.
- Beginning on page 52, a third chart compares different digital protocol analog equipment.

(continued from page 45)

far too great to be covered in one article.

Previous *Network World* Buyer's Guides have examined the high and low ends of the testing equipment spectrum, including LAN analyzers ("The troubleshooters," *NW,* April 10) and test equipment designed specifically for T-carrier lines ("Testing the waters," *NW,* April 17).

This article focuses on the equipment for testing the middle range of networks: analog line testers, digital line testers and digital protocol analyzers (see charts, pages 50, 51 and 52).

There is some overlap between categories of tested parameters and types of tests due to the nature of what's being tested. There is also some overlap between the listed protocol analyzers and many protocol analyzers for LANs.

There are at least 100 companies throughout the U.S. and Canada making some sort of network testing equipment — everything from breakout boxes and bit error rate testers to digital protocol analyzers. The majority of vendors make equipment for testing LANs; some, such as Hewlett-Packard Co., provide a range of network test equipment for local, enterprisewide and wide-area networks (WAN).

> There are at least 100 companies throughout the U.S. and Canada making some sort of net testing equipment.
>
> ▲▲▲

While it is booming, the mid-range test equipment market is also difficult to characterize. Few industry analysts examine the market closely. Most prefer to dwell on the newer, more exciting technologies, such as integrated LAN/WAN management systems. While agreeing that network testing equipment is a very important part of a user's network management strategy, they also feel it's boring.

"Without meaning to put [net test equipment] down, it's basic, necessary stuff," according to Mary Johnston. "It's fairly mundane." Johnston is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting collaborative specializing in management, communications and information strategies.

"It's highly technical," adds Jeff Kaplan, director of networks and professional services with The Ledgeway Group, Inc., a market research and consulting firm in Lexington, Mass. "That may be why so few analysts cover it."

According to Charles Haggerty, associate editor with Datapro Research Corp. of Delran, N.J., "Companies like HP, Atlantic Research Corp. [now the AR Division of Telenex Corp.], Hekimian [Laboratories, Inc.] and Tekelec, Inc. are what you would call the first tier. The others are second tier only because of their size. They put out some pretty good equipment, and, a lot of times, they can be more responsive than some of the big companies."

> "Without meaning to put [net test equipment] down, it's basic, necessary stuff," according to Northeast Consulting's Mary Johnston. "It's fairly mundane."
>
> ▲▲▲

The latest digital test equipment market figures from Dataquest, Inc., a San Jose, Calif.-based market researcher, show HP with about 33% of the market, nearly twice that of its nearest competitor.

Telenex moved into second place with its recent acquisition of Atlantic Research, giving it a combined total of approximately 17%. Tekelec and Digilog, Inc. follow with nearly 13% each. Other major players in this market are Digitech, Inc., Idacom Electronics, Ltd., LP Com (including Tektronix, Inc.) and Network Communications Corp.

One thing that will change the market structure is the merging of Digilog with CXR Telecom of San Jose, Calif., slated to become official Oct. 31. Digilog and CXR Telecom will then become subsidiaries of the new CXR Corp.

Production and marketing for some testing equipment will be shifted from one subsidiary within the new CXR Corp. to others. Details were not available at press time as to which division would have final responsibility for each.

Technology trends

Analysts see the basic trend in network testing equipment following the lead of the computer industry in general: bigger bangs for the buck.

"I think people are looking for sets that will give them more for their money,"

(continued on page 56)

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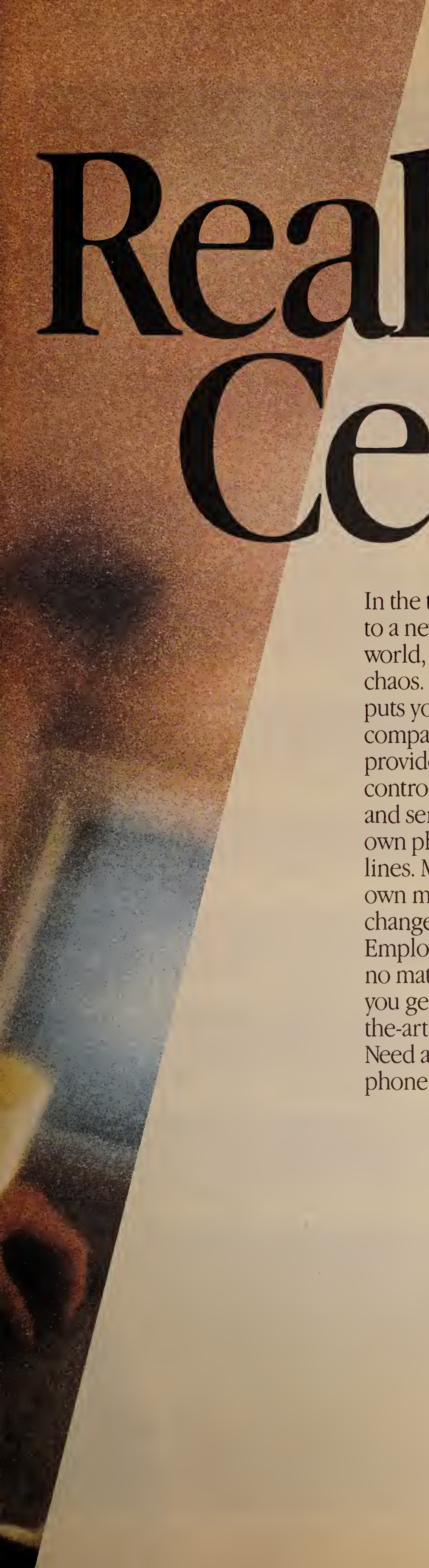

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NETWORK WORLD

Analog line test equipment

Vendor	Product	Hardware	User-programmable software	Display	Power (voltage)	Interfaces supported	Peripheral ports available	Remote communications supported	Tests performed/parameters measured	Frequency response tested	Automatic testing available	Price/warranty period
AEA Electronic, Ltd. **Richmond, Ontario** **(613) 838-2554**	Wireline Simulator	S, R	No	LCD	110 to 220 AC	2-wire/4-wire 3002	None	No	dB level, frequency, noise, phase jitter, amplitude jitter, envelope delay, distortion, signal/noise ratio, impulse noise, hits and dropouts	500 kHz	Yes	$12,000/3 years
Ameritec Corp. **Covina, Calif.** **(818) 915-5441**	AM-48	S	Yes	LCD	115 AC, 9 DC; BS	2-wire/4-wire 3002, proprietary	1	No	dB level, frequency, noise, phase jitter, amplitude jitter, signal/noise ratio, impulse noise, hits and dropouts, store/recall memories, MF, DTMF dial, seep, slope	200 Hz to 20 kHz	Yes	$2,995 (M)/1 year
AR Division of Telenex Corp. **Springfield, Va.** **(703) 644-9000**	Interview Series	S	Yes	LCD	115 to 230 AC; BS	V.35, RS-232-C, RS-232-D	2	Yes	dB level, frequency, noise, amplitude jitter	100 Hz to 20 kHz	No	$2,845 to $6,645 (M)/1 year
Atelco-Navtel **Norcross, Ga.** **(404) 446-2665**	HATS 2B	S	No	LCD	110 to 220 AC; BS	2-wire/4-wire 3002, RS-232-C, RS-232-D	Yes	No	dB level, frequency, noise, phase jitter, signal/noise ratio, impulse noise, dropouts, auto sweep, 3-tone sweep	20 Hz to 110 kHz	Yes	$2,995 (L, M)/1 year
Bradley Telcom Corp. **Leonia, N.J.** **(201) 461-5903**	VF Line Analyzer	S, R	No	LED, CRT	115 to 230 AC	2-wire/4-wire 3002, Western Electric 310	None	No	dB level, frequency, noise, phase jitter, amplitude jitter, signal/noise ratio, impulse noise, hits and dropouts	100 Hz to 5 kHz	No	$6,995/1 year
CSE Technologies **New London, Minn.** **(800) 428-9267**	8412	S, R	No	LED	120 AC, -48 DC; BA	RS-232-C	None	Yes	dB level, frequency, noise, signal/noise ratio, impulse noise	400 Hz to 60 kHz	No	$1,850 (L, M)/1 year
CXR Telcom Corp. **San Jose, Calif.** **(408) 435-8520**	520C	S, R	Yes	LCD	110 to 220 AC; BA	2-wire/4-wire 3002, V.35, RS-232-C, RS-232-D, T-1 access	1	Yes	Frequency, noise, phase jitter, amplitude jitter, envelope delay, distortion, signal/noise ratio, impulse noise, hits and dropouts, P/AR, return loss, IMD, spectrum analysis, DTMF, MF	40 Hz to 200 kHz	Yes	$5,000 (M)/2 years
Dataprobe, Inc. **Englewood, N.J.** **(201) 569-6464**	The Listener	S, H	No	LED	9 DC; BS	2-wire/4-wire 3002, dial line	None	No	dB level, line battery voltage/polarity	None	No	$149/1 year
Electrodata, Inc. **Bedford Heights, Ohio** **(216) 663-3333**	ATS 2	H	Yes	LCD	110 AC; BS	2-wire/4-wire 3002	None	No	dB level, frequency, noise, signal/noise ratio, impulse noise, P/AR	50 Hz to 5 kHz	No	$1,995/1 year
Hekimian Laboratories, Inc. **Gaithersburg, Md.** **(301) 590-3600**	3701/3703	S, R	Yes	LED, CRT	105 to 260 AC, -48 DC	2-wire/4-wire 3002, IEEE-488, RS-232-C, V.24	1	Yes	dB level, frequency, noise, phase jitter, amplitude jitter, envelope delay distortion, signal/noise ratio, impulse noise, hits and dropouts, P/AR, DTMF, MF, IMD	40 Hz to 20 kHz	No	$6,995 (L, M)/1 year
Metro-Tel Corp. **Santa Clara, Calif.** **(408) 988-5200**	200P	S	No	LCD	110 AC; BS	2-wire/4-wire 3002	None	No	dB level, frequency, noise, impulse noise, P/AR	110 kHz	No	$2,500/1 year
MPI Technologies, Inc. **Huntington Beach, Calif.** **(213) 592-3388**	TE 01	S	No	LED	6 DC; BS	IBM 3270 coaxial	None	No	dB level, frequency, noise, impulse noise, hits and dropouts	2.35 MHz	Yes	$200/3 years
Network Communications Corp. **Eden Prairie, Minn.** **(612) 944-8559**	6640 Network Probe	S	Yes	LCD	115 AC; BS	2-wire/4-wire 3002, V.35, RS-232-C, RS-232-D, proprietary, BNC	Yes	Yes	dB level, frequency, noise, AC/DC voltage and resistance	100 Hz to 20 kHz	Yes	$5,995 to $6,995 (L)/1 year
Network Control Corp. **Danbury, Conn.** **(203) 743-5354**	Janus Automated Trunk Testing System	S	Yes	Not applicable	110 AC	2-wire/4-wire, RJ-11	None	Yes	P/AR, phase jitter	None	Yes	$6,000 to $11,500 (L, M)/1 year
Phoenix Microsystems **Huntsville, Ala.** **(205) 721-1200**	Model 5148	S, R	Yes	Information not available	110 AC	IEEE-488, RS-232-C	Yes	Yes	dB level, frequency, noise, signal/noise ratio, impulse noise, hits and dropouts	10 Hz to 3.9 kHz	No	$5,995 (L, M)/1 year
Sierra/LSI Jennings **San Jose, Calif.** **(800) 227-8452**	809B CAMS	S	Yes	LED	115 AC	2-wire/4-wire 3002, IEEE-488, RS-232-C	2	Yes	dB level, frequency, noise, phase jitter, envelope delay distortion, signal/noise ratio, impulse noise, hits and dropouts, P/AR, IMD	20 Hz to 20 kHz	Yes	$8,900/3 years
Tau-tron, Inc. **Westford, Mass.** **(800) 828-8766**	1125 Transmission Test Set	S, R	Yes	LED	115 AC; BS	2-wire/4-wire 3002	None	No	dB level, frequency, noise, impulse noise	40 Hz to 110 kHz	Yes	$3,895 (L)/3 years
Tektronix, Inc. **Mountain View, Calif.** **(415) 967-5400**	TC 1000 TIMS Test Set	S	Yes	Gas plasma	110 AC	2-wire/4-wire 3002, IEEE-488	2	Yes	dB level, frequency, noise, phase jitter, amplitude jitter, envelope delay distortion, signal/noise ratio, impulse noise, hits and dropouts, P/AR	20 Hz to 110 kHz	No	$7,900 (L, M)/1 year
TelWatch, Inc. **Boulder, Colo.** **(800) 669-1266**	NetWatch	S, R	Yes	CRT	110 AC; BS	2-wire/4-wire 3002, RS-232-C	None	Yes	dB level, noise, signal/noise ratio	Signaling 0 to 55 Hz; noise 3 kHz flat	Yes	$4,750 and up (M)/1 year
Wandel & Goltermann, Inc. **Research Triangle Park, N.C.** **(919) 941-5730**	DLA-5 Data Line Analyzer	S, R	Yes	LCD	110 to 220 AC	2-wire/4-wire 3002, IEEE-488, RS-232-C, RS-232-D, X-Y plotter output	1	Yes	dB level, frequency, noise, phase jitter, amplitude jitter, envelope delay distortion, signal/noise ratio, impulse noise, hits and dropouts, noise level vs. time frequency shift	200 Hz to 4 kHz	Yes	$14,500 and up (L, M)/1 year

Hardware:
H = Hand-held
R = Rack-mountable
S = Stand-alone

Power:
BA = Battery available
BS = Battery standard

Tests performed/parameters measured:
DTMF = Dual-tone multifrequency
IMD = Intermodulation distortion
MF = Multifrequency pulse
P/AR = Peak-to-average ratio

List price:
L = Lease available
M = Maintenance contract available

This chart includes a representative selection of vendors in the analog line tester market. Most vendors offer other analog line testers, and many vendors not included offer a full range of competitive products.

NETWORK WORLD CHART

NETWORK WORLD

Digital line test equipment

Vendor	Product	Hardware	User-programmable software	Display	Power (voltage)	Interfaces supported	Peripheral ports available	Remote communications supported	Tests performed/ parameters measured	Maximum bit rate (bit/sec)	Automatic testing available	Channel service unit required	Price/ warranty period
AR Division of Telenex Corp. **Springfield, Va.** **(703) 644-9000**	Interview 50	S	Yes	LCD	115 to 230 AC, 12 DC; BS	V.24, V.35, RS-449, RS-232-C	1	Yes	Bit error and block error rate testing, PRPG, DLM, DDE	2.084M	No	No	$11,950 (M)/1 year
Atelco-Navtel **Norcross, Ga.** **(404) 446-2665**	Datatest 2 Plus	S	Yes	LCD	110 to 220 AC; BS	V.24, V.35, RS-449, RS-232-C, X.21	Yes	Yes	Bit error and block error rate testing, PRPG, DLM, DDE	72K	Yes	Yes	$2,195 (L,M)/1 year
Bradley Telcom Corp. **Leonia, N.J.** **(201) 461-5903**	Interceptor 264	S, R	No	LED, fluorescent	115 to 230 AC	V.24, RS-449, RS-232-C, IEEE-488	None	Yes	DLM, DDE, channel access, VF drop and insert, data drop and insert, signaling bits, drop and insert	19.2K	No	No	$6,795/1 year
CSE Technologies **New London, Minn.** **(800) 428-9267**	8406	S	No	LED	120 AC; BS	RS-232-C	None	Yes	Bit error and block error rate testing, PRPG, DS1 performance monitoring, DS0 access	1.544M	No	No	$3,175 (L,M)/1 year
Datacommunications Test Instruments, Inc. **Springfield, Va.** **(703) 569-5800**	DT-2000 C	R	Yes	LED, CRT	120 AC	V.24, V.35, RS-449, RS-232-C	3	No	Bit error and block error rate testing, PRPG, DLM, DDE	19.2K	No	No	$8,995 (L,M)/1 year
Electrodata, Inc. **Bedford Heights, Ohio** **(216) 663-3333**	CTS 3	H	Yes	LED	110 AC; BS	V.24, V.35, RS-232-C	None	No	Bit error and block error rate testing, PRPG, DLM, DDE	2.048M	Yes	No	$1,995/1 year
Frederick Engineering **Columbia, Md.** **(301) 290-9000**	Feline-XB	S	Yes	LCD, CRT	110 AC; BA	V.24, V.35, RS-232-C	2	Yes	Bit error and block error rate testing, DLM, DDE	72K	Yes	No	$2,695 (L,M)/1 year
Hard Engineering, Inc. **Huntsville, Ala.** **(800) 367-3126**	205	P	Yes	Electro-luminescent	110 AC	V.35, RS-449, RS-232-C, ISDN BRI and PRI	1	Yes	Bit error and block error rate testing, PRPG, DLM, DDE	256K	Yes	No	$9,995 and up (L, M)/1 year
Hekimian Laboratories, Inc. **Gaithersburg, Md.** **(301) 590-3600**	3705/3707 Communications Test System	S, R	Yes	LED, CRT	105 to 260 AC, -48 DC	V.24, RS-232-C, IEEE-488	1	Yes	Bit error rate testing, PRPG, monitor and drop and insert, BPV, CRC errors, excessive zeros, errored seconds, frame alignment, frame bit errors	1.544M	No	No	$10,795 (L, M)/1 year
IQ Technologies, Inc. **Bellevue, Wash.** **(206) 451-0232**	SAM2000	S	No	LCD	110 AC, 9 DC; BA	RS-232-C	1	No	Bit error rate testing, PRPG, DLM, DDE	38.4K	No	No	$795/1 year
Metro-Tel Corp. **Santa Clara, Calif.** **(408) 988-5200**	100R-8 DSI Drop & Monitor	R	No	LED	110 to 120 AC	V.24, V.35, RS-232-C	None	No	BPV, frame errors, bit signaling status	1.544M	No	No	$1,295/1 year
Network Communications Corp. **Eden Prairie, Minn.** **(612) 944-8559**	6640/D Network Probe	S	Yes	LCD	115 AC; BS	V.24, V.35, RS-449, RS-232-C, proprietary	5	Yes	Bit error and block error rate testing, PRPG, DLM, DDE	128K	Yes	Yes	$5,995 to $6,995 (L)/1 year
Phoenix Microsystems **Huntsville, Ala.** **(205) 721-1200**	5500A	S, R	Yes	CRT	110 AC	V.24, V.35, RS-449, RS-232-C, G.703	None	Yes	Bit error and block error rate testing, PRPG; DLM, DDE	13M	Yes	No	$6,995 (L,M)/1 year
Progressive Computing **Oak Brook, Ill.** **(312) 574-3399**	ISDN tel/scope	PC-based	Yes	LED, LCD, CRT	110 AC (PC-based)	V.24, V.35, RS-232-C, ISDN BRI/RJ-45	None	Yes	Bit error and block error rate testing, DLM, DDE	64K	No	No	$5,995 (M)/1 year
Sierra/LSI Jennings **San Jose, Calif.** **(800) 227-8452**	460A T1 Printing Analyzer	S	Yes	LCD	115 AC; BS	RS-232-C	None	No	Bit error and block error rate testing, PRPG, DLM, programmable	1.544M	Yes	No	$3,250/3 years
Tau-tron, Inc. **Westford, Mass.** **(800) 828-8766**	5110 DS1 Test Set	S	Yes	LCD	115 AC	RS-232-C	None	Yes	DLM	1.544M	Yes	No	$5,400 (L)/3 years
Tekelec, Inc. **Calabasas, Calif.** **(818) 880-7900**	Chameleon 8000	S, R	Yes	LED, CRT	110 to 120 AC	V.24, V.35, RS-449, RS-232-C	Information not available	Information not available	Bit error and block error rate testing, PRPG, DDE, DS0, DS1, DS3, fractional T-1, T-1	9M	Yes	No	$7,750 (L,M)/1 year
TelWatch, Inc. **Boulder, Colo.** **(800) 669-1266**	T-OneWatch	S, R	Yes	CRT	110 AC; BS	RS-232-C	None	Yes	Alarms reported, facilities performance, coding violations	1.544M	Yes	Yes	$4,750 and up (M)/1 year
Wandel & Goltermann, Inc. **Research Triangle Park, N.C.** **(919) 941-5730**	DT-10	S	No	LCD	110 to 120 AC; BS	V.24	1	No	Bit error and block error rate testing, PRPG, DLM, DDE	20K	No	No	$4,200 and up (L)/1 year

Hardware:
H = Hand-held
P = Portable
R = Rack-mountable
S = Stand-alone

Power:
BA = Battery available
BS = Battery standard

Interfaces:
BRI = Basic Rate Interface
PRI = Primary Rate Interface

Tests performed/ parameters measured:
BPV = Bipolar variations
CRC = Cyclic redundancy check
DDE = Data terminal equipment/data communications equipment emulation
DLM = Data line monitoring
PRPG = Pseudo-random pattern generation
VF = Voice frequency

List price:
L = Lease available
M = Maintenance contract available

This chart includes a representative selection of vendors in the digital line tester market. Most vendors offer other digital line testers, and many vendors not included offer a full range of competitive products.

NETWORK WORLD CHART

Digital protocol analyzers (continued on page 56)

Vendor	Product	Hardware	User-programmable software	Display/ graphics	Power (voltage)	Protocols monitored	Traps	Network performance analysis supported	External clock rate (bit/sec)	Interfaces supported	Peripheral ports available	Remote communications supported	Capture buffer size (bytes)	Price/ warranty period
AR Division of Telenex Corp. Springfield, Va. (703) 644-9000	Interview 7000	S, R	Yes	Gas plasma/ Yes, UP	115 to 230 AC	ISDN, LAP-D, SS7	Counters, protocol-specific averts	Yes	2M	V.24, V.35, RS-449, RS-232-C, RS-485	4	Yes	Up to 20M w/hard disk	$15,995 (L, M)/ 1 year
Atelco-Navtel Norcross, Ga. (404) 446-2665	Datatest 9400	S, R	Yes	CRT/Yes	110 to 120 AC	Asynchronous, BSC, SDLC, HDLC, X.21, X.25, BPS, ISDN	SNA PU, SNA LU, X.25	Yes	64K	V.24, V.35, RS-449, RS-232-C, proprietary, ISDN BRI, X.21	Yes	Yes	1.44M	$5,495 (L, M)/ 1 year
CXR Telcom Corp. San Jose, Calif. (408) 435-8520	841A	S, R	Yes	CRT/ Yes, UP	110 to 220 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, BPS, ISDN BRI, SS7	Any of 25 RS-232-C leads	No	64K	RS-232-C, X.21, ISDN BRI	1	Yes	400K	$5,500 (M)/ 2 years
Datacommunications Test Instruments, Inc. Springfield, Va. (703) 569-5800	DT-1600	S, R	Yes	LED, CRT/No	120 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	No	100K	V.24, V.35, RS-449, RS-232-C	3	No	8K	$8,750 (L, M)/ 1 year
Digilog, Inc. Montgomeryville, Pa. (800) 344-4564	620i ISDN/BRI Protocol Analyzer	S, R	Yes	LED, CRT/ Yes, UP	115 to 220 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, BPS, ISDN, SS7, ADCCP, AUTODIN	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	128K	V.24, V.35, RS-449, RS-232-C	Yes	Yes	32K	$14,995 (L, M)/ 3 years
Digitech Industries, Inc. Ridgefield, Conn. (203) 438-3731	700 Series	S, R	Yes	CRT/Yes	110 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	No	72K	V.24, V.35, RS-449, RS-232-C	2	Yes	256K RAM, 1.4M disk	$3,450 and up (L, M)/ 1 year
Frederick Engineering Columbia, Md. (301) 290-9000	PA8552A	PC card	Yes	LCD, CRT (PC monitor)/ Yes, UP	110 AC; BA	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, X.75, SNA, NRZ, Q.921, Q.931, IPARS	Time of day, keyboard	Yes	64K	V.24, V.35, RS-232-C, ISDN BRI, ISDN CEPT PRI, ISDN T-1 PRI	2	Yes	PC-memory dependent	$1,695 (L, M)/ 1 year
Hard Engineering, Inc. Huntsville, Ala. (800) 367-3126	705	S, P	Yes	Electroluminescent/Yes	110 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, ISDN, SS7	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	256K	V.35, RS-449, RS-232-C, ISDN PRI and BRI, T-1	1	Yes	2M	$6,495 to $11,995 (L, M)/ 1 year
Hewlett-Packard, Colorado Telecommunications Division Colorado Springs (719) 531-4414	HP 4952A	S, R	Yes	CRT/No	100 to 240 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, BPS, IPARS, SNA	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	64K	V.24, V.35, RS-449, RS-232-C, X.21, ISDN	2	Yes	32K	$ 6,970 (L, M)/ 3 years (hardware only)
Idacom Electronics, Ltd. Irvine, Calif. (714) 261-7663	PT500	S, R	Yes	CRT/No	110 AC	Asynchronous, DDCMP, BCS, SDLC, HDLC, X.21, X.25	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	50K to 256K	V.24, V.35, RS-449, RS-232-C, ISDN BRI and PRI, DB-9, external voice, CEPT	Yes	Yes	40M	$21,800 (L, M)/ 1 year
M-Test Equipment San Francisco (415) 861-2382	ComTest Data Line Analyzer 400	PC card	Yes	CRT (PC monitor)/ Yes, UP	110 AC; BA	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits, user-programmable	Yes	96K	V.24, V.35, RS-449, RS-232-C, proprietary	PC-dependent	PC-dependent	390K	$4,995/ 1 year
Network Communications Corp. Eden Prairie, Minn. (612) 944-8559	6640/D II Network Probe	S	Yes	LCD/Yes	115 AC; BS	Asynchronous, DDCMP, BSC, SDLC, HDLC, IPARS, baudot, SNA	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits, transmitter, keyboard	Yes	400K aggregate	V.24, V.35, RS-449, RS-232-C, proprietary (remote control)	5	Yes	128K RAM, 700K disk	$5,995 to $6,995 (L)/ 1 year
Progressive Computing Oak Brook, Ill. (312) 574-3399	LMI Protocol Analyzer	S (PC-based)	Yes	CRT (PC Monitor)/ Yes, UP	110 AC (PC-based)	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.25, Q.931, IPARS, X.75	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	72K	V.24, V.35, RS-232-C	No	Yes	32K w/o disk	$1,695 (M)/ 1 year
Realtime Techniques Alexandria, Va. (703) 836-3424	RTT-1000 w/hard disk	S	Yes	CRT/Yes	120 AC	Asynchronous, BSC, SDLC, HDLC, X.25, BPS, SNA, SS7	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	No	512K	V.24, V.35, RS-449, RS-232-C	1	No	52K	$3,995 (L, M)/ 2 years

Hardware:
P = Portable
R = Rack-mountable
S = Stand-alone
Graphics:
UP = User programmable
Power:
BA = Battery available
BS = Battery standard
Protocols monitored:
ADCCP = Advanced Data Communications Control Procedure
AUTODIN = Automatic Digital Network
BPS = Burroughs Poll Select
DDCMP = Digital Data Communications Message Protocol
IPARS = International Passenger Airline Reservation System
NRZ = Non Return to Zero
Traps:
BC = Block check
CRC = Cyclic redundancy check
CS = Characters/strings
EIA = Electronic Industries Association
LRC = Longitudinal redundancy check
PE = Parity errors
Interfaces:
BRI = Basic Rate Interface
CEPT = Conference Europeenne des Postes et Telecommunications
PRI = Primary Rate Interface
List price:
L = Lease available
M = Maintenance contract available

This chart includes a representative selection of vendors in the digital protocol analyzer market. Most vendors offer other digital protocol analyzers, and many vendors not included offer a full range of competitive products.

NETWORK WORLD CHART

DATA
IML
OFF LINE
ON LINE
EPO
REMOTE
LOCAL
We've made a name for ourselves in connectivity but you don't know it. Yet...

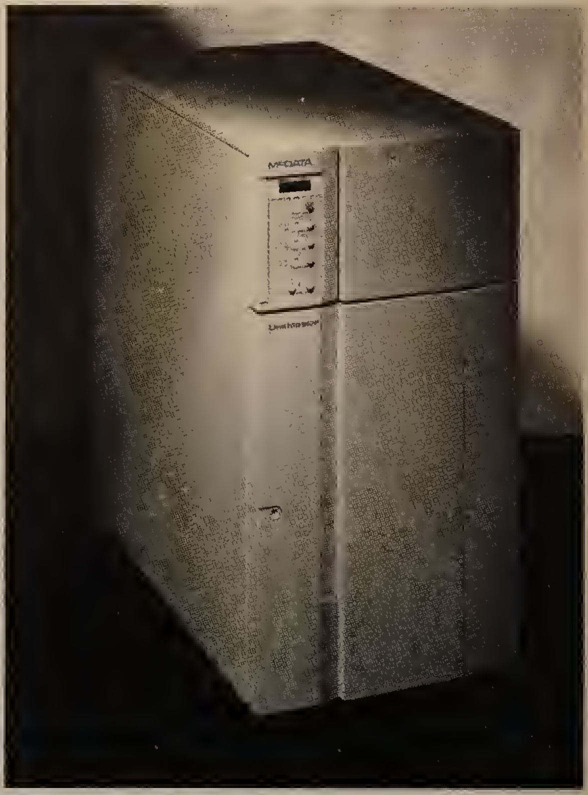
Though we have an installed base of more than 70,000 connectivity devices in more than 38 countries, a worldwide distribution and service system, and are the second-largest manufacturer of 3174 compatible cluster controllers, McDATA is not a familiar name in the industry. Until now, our controllers and other products have gone by many names, sold under private label to widely known vendors.

The 4174 11L supports 64 coax and 24 ASCII devices plus a token ring.

Now we are stepping forward. Twenty new LinkMaster® products, sold under our own name, will change the way the information networking industry thinks and acts about connectivity.

McDATA raises network communications to a new plane of efficiency, going beyond plug-compatibility to a sophistication in connectivity which represents a value in itself, not just a workaday necessity.

For example, for bulk file transfers between hosts, the LinkMaster 6100C network processor allows files on a host to be sent quickly and effectively to not just one, but multiple hosts in multiple locations.


The 6100C network processor utilizes existing channel connections for direct NetView interface.

Using the LinkMaster 5000 series of channel extenders, disaster recovery backup tapes can be made offsite whenever they are needed, eliminating the time and expense of manual tape transportation.

The 5000 series of channel extenders can be installed in less than one hour.

LinkMaster 4174 controllers interconnect 3270 terminals, ASCII terminals and PCs to multiple hosts, either DEC or IBM. And LinkMaster products enhance network management with direct NetView interface.

These are just a few highlight examples of McDATA's LinkMaster network solutions at work.

LinkMaster goes beyond compatibility to the next stage of the network communications evolution, a comprehensive multivendor connectivity which, in high-speed, long-distance channel communications, represents the next significant horizon to be crossed.

The new standard in managing large systems involves faster, more economical, more rational channeling of data across communications barriers which previously could not be spanned. McDATA is establishing that standard.

We span the gaps in network communications. **McDATA**

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DATA

NETWORK WORLD

Digital protocol analyzers (continued from page 52)

Vendor	Product	Hardware	User-programmable software	Display/ graphics	Power (voltage)	Protocols monitored	Traps	Network performance analysis supported	External clock rate (bit/sec)	Interfaces supported	Peripheral ports available	Remote communications supported	Capture buffer size (bytes)	Price/ warranty period
Technology 80, Inc. **Minneapolis** **(612) 542-9545**	Chanalyzer	S	No	CRT/No	115 to 230 AC	IBM 370 I/O, byte multiplexer, block multiplexer, data streaming	User-programmable	No	Information not available	IBM 370/FIPS	1	Yes	512K	$29,500 to $32,500 (L, M)/ 1 year
Tekelec, Inc. **Calabasas, Calif.** **(818) 880-7900**	Chameleon 20-I/P	S, R	Yes	LCD/Yes	110 to 120 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, X.75, SNA (LU 6.2), Q.921/Q.931, QLLC, SS7	CS, PE, CRC, LRC	Yes	256K	V.24, V.35, RS-449, RS-232-C	Yes	Yes	1M	$15,000 to $18,000 (L, M)/ 1 year
Tektronix **Mountain View, Calif.** **(415) 967-5400**	TC 1000	S	Yes	Gas plasma/ Yes, UP	110 AC	Asynchronous, DDCMP, BSC, SDLC, HDLC, X.21, X.25, BPS	CS, PE, CRC, LRC, BC, time-outs, EIA lead changes, frames, packets, bits	Yes	256K	V.24, V.35, RS-449, RS-232-C, proprietary	2	Yes	1M	$7,820 (L, M)/ 1 year
TeleProcessing Products, Inc. **Simi Valley, Calif.** **(805) 522-8147**	TP-270	S	Yes	LED	110 AC	BSC, SDLC, BPS	Poll time, poll response time, CPU wait time, CPU/terminal message time, data rate, characters, messages	Yes	0 to 19.2K	RS-232-C	1	Yes	Information not available	$2,875 (L)/ 1 year

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AUTODIN = Automatic Digital Network
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This chart includes a representative selection of vendors in the digital protocol analyzer market. Most vendors offer other digital protocol analyzers, and many vendors not included offer a full range of competitive products.

NETWORK WORLD CHART

(continued from page 46)

Haggerty says. "Instead of buying two or three boxes, they want everything in one box."

"We're definitely seeing a move to more intelligence in test equipment," adds Marvin Chartoff, group manager with Fairfax, Va.-based Network Strategies, a division of Ernst & Young that provides telecommunications consulting services. "People want more than just stand-alone boxes."

The other big trend is toward equipment portability. Some vendors offer what they call handheld, or portable, versions of their stand-alone testers. According to Haggerty though, handheld is in the eye of the holder.

" 'Transportable' might be a better word," he explains. "[Portable test units] aren't something you can stick in your pocket. They're more like something you don't have to keep at the central site. What makes these portable boxes so attractive is that they have a lot of the same features that larger equipment has but can be carried around."

With the trend to more and better features in a smaller, portable box, is there a chance that network users may soon have a box that tests analog and digital lines, as well as analyzes network transmission protocols, in one portable box?

"I wouldn't be surprised if it happens," Haggerty says. "It certainly sounds like a good idea; it'll probably come to pass. We may come to a situation in the next few years where we come to a complete blurring of distinctions [between equipment types]."

What to consider

Portability and other conveniences are relatively small factors to be weighed in a test equipment purchase. Consultants and analysts offer the following criteria for selection.

■ **What will be tested?** Your specific set of test needs — current and future — is the main criterion for selection of test equipment.

Make sure the equipment tests what you want tested; don't assume that a high-priced, high-powered machine will do everything you want it to do. Learn all you can about test equipment before you go shopping.

"If the set has capabilities you don't need today, that doesn't mean you won't need them a year from now," Haggerty says. "Those capabilities shouldn't prevent you from buying a particular piece of equipment, even if it does cost more. It's my experience that systems don't get smaller; they tend to go in the opposite direction."

One thing to look for would be T-1 capabilities, he suggests. "That's the type of thing a manager of a small system might not need now, but in two or three years, it could really become important."

Chartoff also sees a move to providing support for Integrated Services Digital Networks. As ISDN becomes more widely available, users will need equipment to monitor ISDN-specific protocols.

Fiber-optic test equipment is another growth area. The move to fiber optics in user networking is boosting the market for such items as optical time-domain reflectometers and other fiber-optic testing equipment.

> "What makes these portable boxes so attractive is that they have a lot of the same features that larger equipment has but can be carried around."
>
> ▲▲▲

■ **How will the test set interact with the network?** Do you want to simply monitor traffic or transmit pseudo-random test messages and measure network reaction?

Allied with this is the question of how much network interruption your operations can allow. If the testing you want done or the equipment you plan to use disrupts network operations during testing, how will that affect your regular business?

Users have been asking vendors for nondisruptive test equipment, and more vendors are coming out with products that don't require users to shut down the network to test the lines.

"Users shouldn't have to do their testing early in the morning or late at night, or figure out how much disruption they can live with," Haggerty asserts. "Live, nondisruptive testing is, for obvious reasons, preferable."

■ **Decide the type and level of transmissions to be tested.** Do you want to measure only line voltage, or do you need more intelligent functions that measure message content and format? What message protocols will you need to monitor?

The evolution of network testing equipment will, predictably, follow the continuing evolution of the networks themselves. More digital transmission services will bring a greater need for more and better digital line testers and digital protocol analyzers. The growth of fiber optics and ISDN usage will spur development of more sophisticated — and probably less expensive — test equipment for users of these technologies.

Future expectations

Analog line test equipment is seen by some as the poor stepchild of the mid-range test equipment family. Labeled by some industry pundits as a declining technology, networks using dial-up or leased analog lines are still a potent market force and should continue to be for some time.

However, it wouldn't be surprising to see the features of current analog line testers incorporated into the new generation of faster, powerful and more versatile high-speed modems.

Most vendors of high-speed modems offer extensive network test or control features as standard or optional equipment on their top-of-the-line products. As with digital test equipment, modems are offering more network test and control features each year as the market matures and the technology declines in price. ◻

Letters

continued from page 39

"growning pains." The NIU Forum experienced growing pains last year. Now is the time for action — irrespective of which organizations manage or sponsor the forum.

The NIU Forum is an open workshop activity composed of volunteers who meet on a regular basis. It is not a membership organization; consequently, no company can withdraw from it.

GM has no intention of "leading an exodus" from or "publicly criticizing" the NIU Forum. It is prudent for any business, including GM, to reevaluate its activities when expectations perceived as critical are in question.

We believe in the mission of the NIU Forum, and our commitment shown to date demonstrates this. Our actions at the October '89 NIU Forum meeting were both timely and proper.

Michael Kaminski
Manager
CIM/Network Technologies

Karl Schohl
Senior project engineer
CIM/Network Technologies

Gary Workman
Standards coordinator
C4 Communications Project

GM advanced engineering staff
General Motors Technical Center
General Motors Corp.
Warren, Mich.

Encouraging competition

Your Aug. 21 editorial titled "Stronger action needed to spur info services market" makes some interesting suggestions on how to promote the information services market.

However, we would like to add some thoughts.

It is important to recognize that a healthy, growing and competitive information services market exists today. The National Telecommunications and Information Administration estimates that 3,700 data bases are available in the U.S. today, which is an increase from 400 in 1980.

This increase of data bases represents a 32% compounded annual growth rate. Many of these are low-cost services delivered over a variety of value-added networks and are available to virtually all homes and businesses.

The Federal Communications Commission's distinction between basic and enhanced services is practical when considering regulatory policy. When companies control bottleneck basic services and offer competitive enhanced services, it is possible that cross-subsidy and discrimination may occur.

These concerns are recognized by the Modified Final Judgment, and they also are the reason for maintaining the current restrictions. Until the potential for anticompetitive abuse of the local exchange no longer exists, it is appropriate for these restrictions to remain in place.

Your suggestion that regulators promote the development of two broadband networks to all homes and businesses implies allowing intra-local access and transport area competition in basic services. Competition such as this raises a variety of concerns.

Local exchange carriers currently have geographic monopoly franchises designed to promote universal service. Ratepayers bear these costs, including a substantial rate of return. Even if regulators permit intra-LATA competition, it is unlikely a new entrant could afford the investment required to compete.

As local exchange carriers continue to upgrade their networks with ratepayer funds, the prospect of a truly competitive situation becomes less likely. Ratepayer-funded functionalities and upgrades that enable local exchange carriers to enter competitive lines of business further exacerbate the problem. Regulators need to examine such fundamental issues before promoting the investments required to provide two ubiquitous broadband networks.

Finally, your goal of preventing any single company from gaining monopoly control of both communications facilities and information sources is a good one. That is the intent of the Modified Final Judgment restrictions.

Not only is this an appropriate objective, but it is a necessary one in promoting the continued growth of the competitive information industry.

Al Fenn
Senior vice-president
and general manager
Tymnet
McDonnell Douglas Network
Systems Co.
San Jose, Calif.

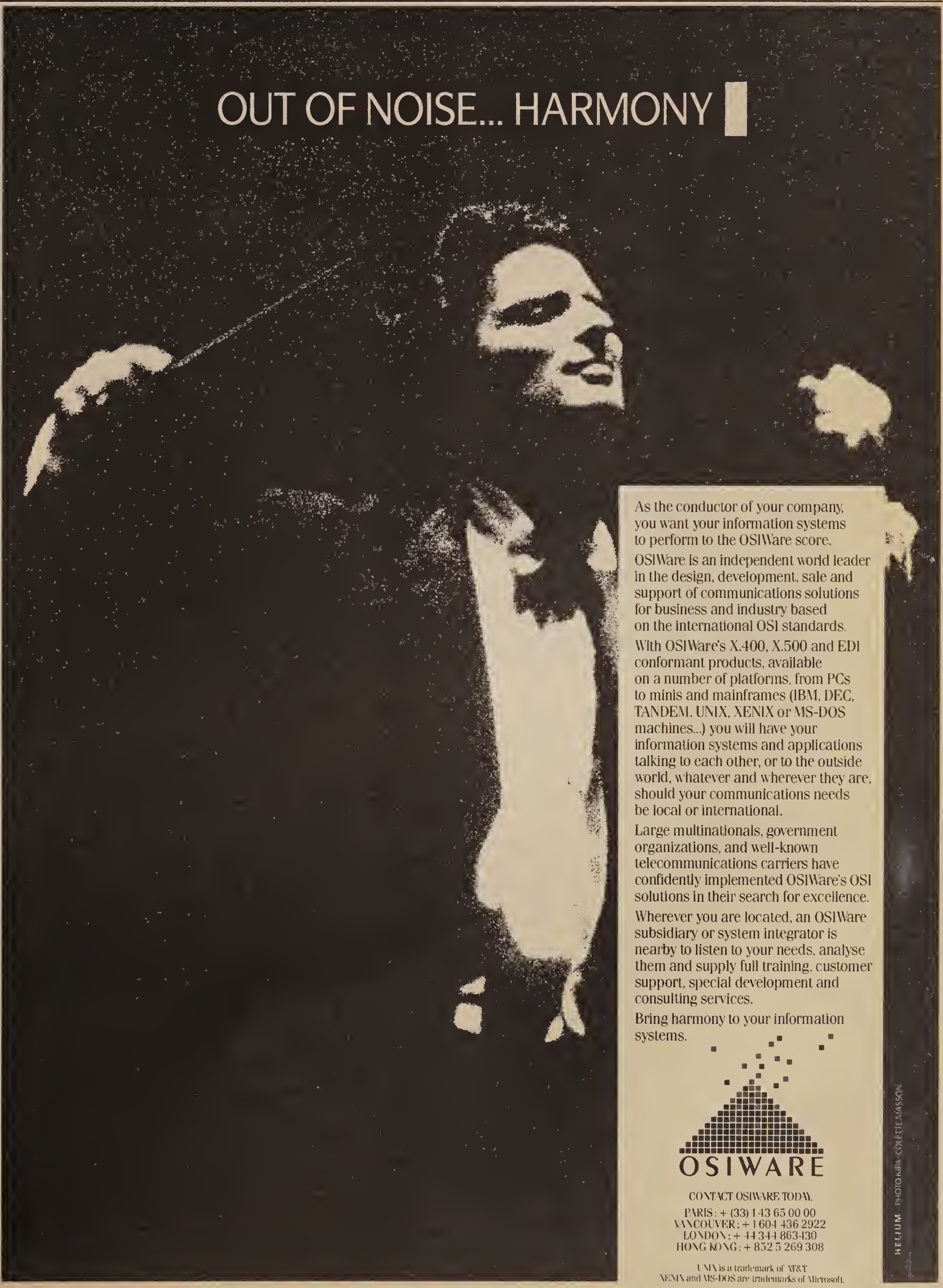
AT&T's own Unix-based systems

An article in your Sept. 11 issue ("Report predicts massive growth for Unix-based LANs") detailed a report by an industry analyst who mistakenly omitted AT&T as a vendor of Unix-based LAN operating systems.

Your readers should be aware that when Release 3.3 of AT&T's StarGroup Server software is issued early next year, it will not only include AT&T's own Unix system-based version of LAN Manager, but it will be our third generation of a Unix-based LAN operating system.

AT&T StarGroup software is based on the Unix operating system because we think it is the best environment upon which to build network services. The report you mention indicates that the marketplace agrees.

Phil Galli
AT&T district manager
StarLAN 10/StarGroup
Marketing
Bridgewater, N.J.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See the FAXNeT Form on Page #58

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Listed below in the FAXNeT Directory are the FAX numbers of participating advertisers in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

Benefits to the *Network World* Reader

FAXNeT is designed to get you product and service information FAST. And, if your request is urgent and requires an immediate response from the vendor just check the "Urgent" Box.

NETWORK WORLD

FAXNeT

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Company/Div ______________________________

Address ______________________________

City ______________ State ________ Zip ____________

Phone ______________ FAX ______________

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- ☐ Request for Sales Call
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- ☐ Request for Information

Purchase Timeframe
- ☐ Within 60 Days
- ☐ Within Six Months
- ☐ Within One Year

Scope of Purchase Responsibility
- ☐ Enterprise Wide
- ☐ Departmental

Purchase Influence/Number of Sites
- ☐ One Site
- ☐ 2-9 Sites
- ☐ 10-20 Sites
- ☐ 21+ Sites

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____

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New realities for ISDN

How can you be in two places at once? Artificial reality, of course.

I received an interesting telephone call years ago. I picked up the receiver and heard a child's voice at the other end asking, "Is Mikey here?"

Upon reflection, I decided the youthful caller had a point. If we could talk together, then in some sense, we were in the same place.

The act of telecommunicating creates a place that consists of the information that both parties share simultaneously. This concept can be viewed as the basis for an alternative approach to telecommunications.

Desktop beginnings

In 1970, I performed a simple experiment that demonstrates this approach. A synchronized two-way video link was established across the campus at the University of Wisconsin. Using full-duplex analog video transmission techniques, video images from two points on campus were superimposed to create a composite video image that was displayed at both ends of the communications link.

One video image was of a small group of people standing against a neutral background in one location. The second image was graffiti, drawn on a data tablet at the second location and shown on a computer graphic display. The idea was to superimpose the drawn images upon the live video image of the group of people. A video camera at the second location captured the combined images on the graphics display.

Krueger is president of Artificial Reality Corp. in Vernon, Conn. For more information about the technology discussed in this feature, see the author's book Artificial Reality *(Reading, Mass: Addison-Wesley Publishing Co., 1983).*

At the same time, as part of a related experiment, we were transmitting data between two computers, each of which had its own graphics display. The displays showed the pulse train, or wave form, of the data being transmitted and received.

In the course of our experiments, a data transmission problem occurred between the two computers. The wave form on my display showed a degenerating signal from the other computer. I called a colleague at the first location to discuss the problem while the two experiments progressed.

We had some difficulty explaining the data signal each saw on his respective graphics display. While on the phone, I realized an alternative to simply talking about the problem.

I asked my colleague to direct the video camera at his location away from the people and toward his display screen to photograph the wave form of the data he was transmitting. I then displayed the signal I was receiving from him on my screen to the camera at my end of the link.

The composite image displayed at both ends of the teleconference contained his transmitted, clear signal at the top of the screen and the degenerated signal I received at the bottom of the screen.

When we pointed at our respective screens, silhouette images of our hands — which were within camera range — appeared in the composite image. We were able to point to the information on the composite image exactly as if we were sitting together on the same side of a table with a drawing between us. In this way, we were able to interact spatially on the screen in real time.

The illusion of being together was so strong that there was a tendency to avoid letting our images touch. The idea of personal distance was recreated in the video world. The communication

(continued on page 60)

By MYRON W. KRUEGER

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(continued from page 59)

was so complete that there was no need to go to the other location.

Videodesk

Common wisdom says that implementation of synchronized two-way video communications will have to wait until fiber optics provides much higher bandwidth over the public network.

However, if the goal is a modest capability that joins the telephone and personal computer, rather than an elaborate teleconferencing center, the bandwidth requirements can be radically reduced to fit within one Integrated Services Digital Network B channel. The technology I have developed to meet this goal is called Videodesk.

If a black-and-white video camera is mounted above a desk to view a user's hands against a neutral background, simple circuitry can distinguish the hands from the desk and produce a binary silhouette image of the hands. With a slight variation on off-the-shelf technology, that image could be superimposed over a graphic image on the user's personal computer or workstation display screen.

If the user wants to talk about information displayed on his screen with a second user in another location, that information can be sent to the second location via standard communications links. Both operators can then use the images of their hands to direct their colleague's attention to points of interest on the screen (see figure on this page).

The binary silhouette image requires 64K bits for acceptable 256-by-256 pixel resolution. Twenty frame/sec is 1.28M bit/sec, which will fit within a T-1 line.

With a little more ettort, that image can be compacted and completely reconstructed at the other end of the telecommunications link. There are many image-compaction techniques, such as run-length encoding. Alternatively, if only the outline of the participant's hands is transmitted, a variety of compaction algorithms can be used, such as conical encoding or variable exception vectors.

It is also possible to construct a representation of the user's hand that is based on digitized knowledge of fingers, thumbs and arms. Another algorithm reconstructs the hand image from this representation. With some effort, an aesthetically pleasing image can be constructed that moves when the user's hand moves and looks good enough for the user to accept as his own.

In addition, the current appearance of the user's hand could be mapped onto a library of possible hand views, and the identifier for this view and its position on the screen could be transmitted at an even lower bandwidth. The bandwidth used depends upon the size of the library or identifier file transmitted.

In constructing the Videodesk environment, Artificial Reality Corp. has developed and implemented an outline silhouette version of this technique. In this manner, we can construct and transmit a recognizable image of a hand with as few as 200 bytes at video rates, allowing the transmission of 20 updates per second over a single ISDN B channel.

Only one hand need be sent in each direction; the composite image is created at both ends. We have not implemented a library of hand views but are confident it could be made to operate over the ISDN data channel.

With this capability, two people can talk about what they see on their respective screens with a very natural use of gesture.

An unexpected aspect of this capability arises when we think of what we might want to do if the other party were not present. It would be very natural to leave a voice message, accompanied by gesture, superimposed over graphics or text information that can be replayed by the other party when they return. This would be an interactive hypermedia application operating over the public network.

Given the increasing presence of voice-messaging systems in major corporations and the joining of voice and data promised by ISDN, it is easy to imagine such a capability evolving. This technology can either be retrofitted to existing computers or incorporated into the design of new products.

In the case of a retrofit, the Videodesk will interface to the existing system at two points. It will intervene between the computer and its monitor, superimposing the image of the user's hands over the graphics and text displayed by the computer.

It will also interpret the movements of the user's fingers as it would signals from a mouse or other pointing device. Thus the gesture interface will place no additional burden on the host processor and should be compatible with existing applications. The interface will also compact and transmit the image of the local

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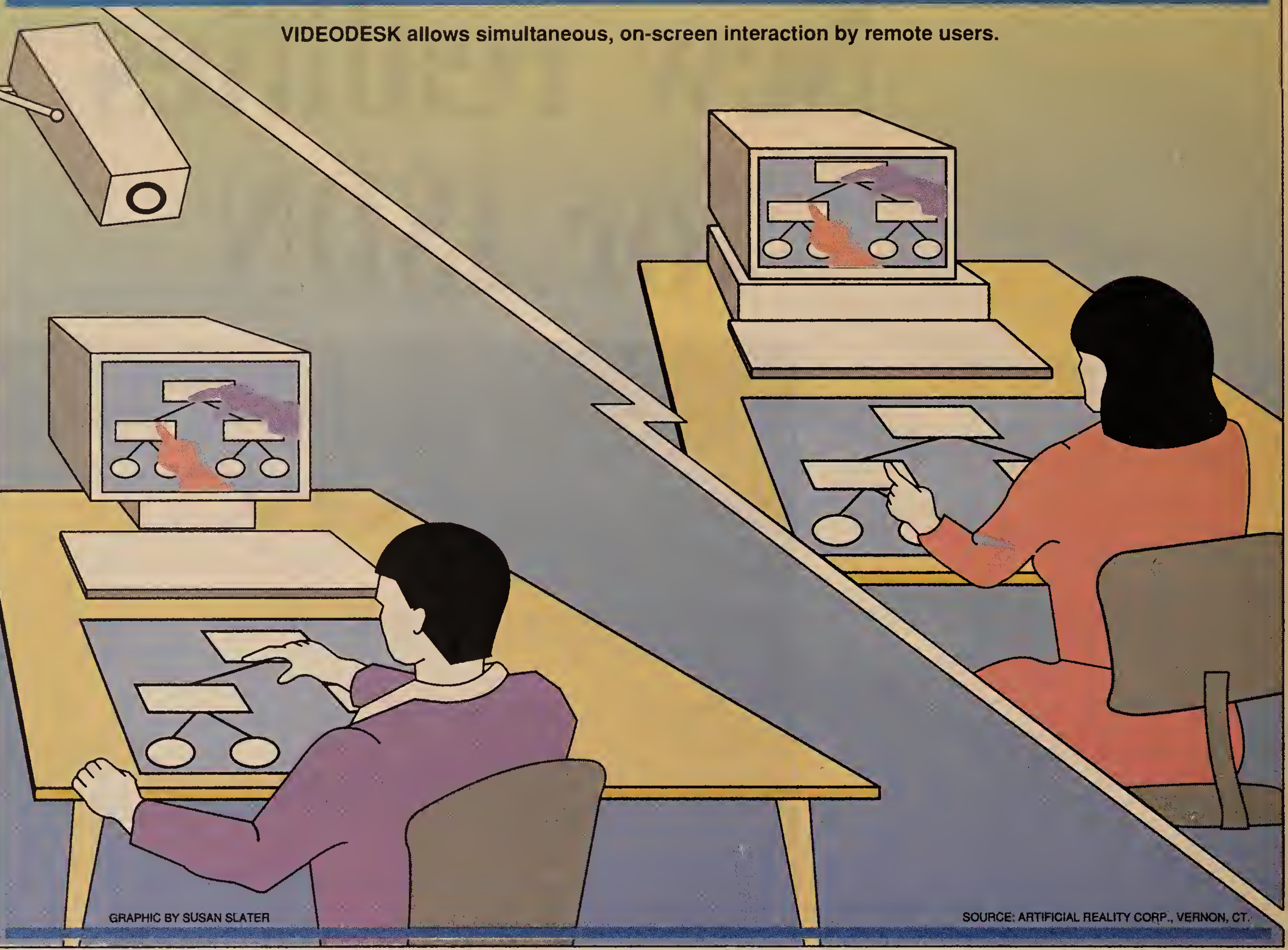
VIDEODESK allows simultaneous, on-screen interaction by remote users.



GRAPHIC BY SUSAN SLATER

SOURCE: ARTIFICIAL REALITY CORP., VERNON, CT.

The pros and cons of simulated vs. artificial reality

Artificial Reality Corp.'s Videoplace is an extension of the computerized simulation idea. The primary distinction between the two is that a simulation provides only limited output and allows the user only a limited ability to provide input.

Living the experience

When airlines train pilots, every effort is made to provide a realistic experience involving all the senses. However, the participant's physical involvement is minimal; simulators allow pilots only to manipulate a few controls. Rather than use their entire bodies, they are limited to manipulating a few levers and knobs.

The artificial reality concept insists that participants be completely immersed in the experience and that they have full use of their body so that the subtleties of gesture can be added to the communications. The system perceives overall behavior, rather than just accepting input from the participants.

The book *Artificial Reality* explores a scenario in which the participant wears sensing devices to operate in such a reality. In 1985, the National Aeronautics and Space Administration actually implemented a project in which the participant wore a sensing glove manufactured by VPL Research of Palo Alto, Calif., and a head sensor made by Polhemus, Inc., a Colchester, Vt.-based division of McDonnell Douglas Corp.

The key ingredient was a pair of glasses that provided a low-resolution computer display with a different image for each eye. These glasses displayed a three-dimensional world. The Polhemus sensor detected the orientation of the user's head; when the user turned it, the graphic image changed to show what the image would be like in the simulated space with the user's head at that viewing angle.

Future uses

Taking the concept of operating two identical applications on remote computers in tandem a step further, it is possible to imagine two people looking into the same simulated 3-D space. This would be useful for an architect and client, two aerospace engineers moving around inside a jet engine or two doctors moving around a 3-D nuclear magnetic resonance image of a patient's body.

To facilitate communications, it would be helpful to have a representation of each person in the simulated environment. If the modeling systems are available at both ends of the teleconference, the amount of information that needs to be transmitted for such a representation would actually be very small.

— *Myron Krueger*

user's hands while receiving and reconstructing the image of the remote user's hands.

To take advantage of multipoint control, a more intimate parallel interface would be required. It would deliver tables of finger and hand locations to the host computer. Existing applications would have to be modified or new ones written to take advantage of this added capability.

If the hardware architecture permits, the hand image can be treated as a graphics object. It can be scaled or translated anywhere on the screen. It can also be displayed in perspective, allowing the user to reach into a three-dimensional screen. Experiments have been performed with stereo video camera pairs for true 3-D viewing.

Control issues

So far, this discussion has focused on the display of a single screen of information. The problem of simultaneously operating the underlying application, which might be a word processor, a spreadsheet or a computer-aided design package, has been ignored.

The single screen of information discussed could easily be transmitted to the other computer and displayed on its screen prior to any use of the Videodesk image transmission. Under these circumstances, bandwidth required for control is minimal and the control information could be squeezed into the ISDN D channel.

A control problem will exist only when one party inputs a command to a computer, causing the underlying application to update the screen.

It is then necessary to transmit this command to the second party's computer, which must present the new information to its application as if it had been input on that second computer. Since both parties might input simultaneously, a protocol governing who takes control of the screen and when is necessary.

Ideally, the software to do this would not be specific to the application and could be used with any commercially available package. Fortunately, there are products starting to appear from small companies that provide this capability.

There are also more advanced capabilities being developed in research projects at the Xerox Palo Alto Research Center, Microelectronics and Computing Corp. and Apple Computer, Inc. under the rubric of "cooperative work" or groupware.

A better mouse

Operating a traditional input device, such as a keyboard or mouse, would conflict with the natural gesture interface in the teleconference previously described. The uncluttered desk needed for hand recognition does not leave room for either of those.

As noted above, the Videodesk computer interprets hand and finger gestures in the same way as a standard personal computer interprets the input from a mouse. Subsumed within the capability for creating a hand representation in real time is the ability to locate the user's fingers on the desk and computer screen. This information can be input to the computer and used to drive its applications in lieu of a mouse, using a standard mouse input interface.

The Videodesk can use the location of the user's fingers on the screen to perform any function a mouse can perform. In addition, it provides simultaneous multipoint input that is impossible with a mouse or any other commonly available input device.

Two fingers can control the opposite corners of a window or the end points of a line. Thumbs and forefingers of two hands offer four points for defining B-spline curves in CAD applications. If graphics "stuff" is extruded through such a spline curve and its shape is changed by the fingers as the graphics material emerges, a complex 3-D shape can be sculpted on the screen in a very short time.

For any function other than word processing, this control based on finger position is sufficient. It is particularly suited for menuing, drawing, pointing and circling, thus providing the flexibility needed to operate most applications.

No failure to communicate

A familiar advertising slogan describes voice telecommunications as "the next best thing to being there." The new goal for telecommunications should be to

(continued on page 76)

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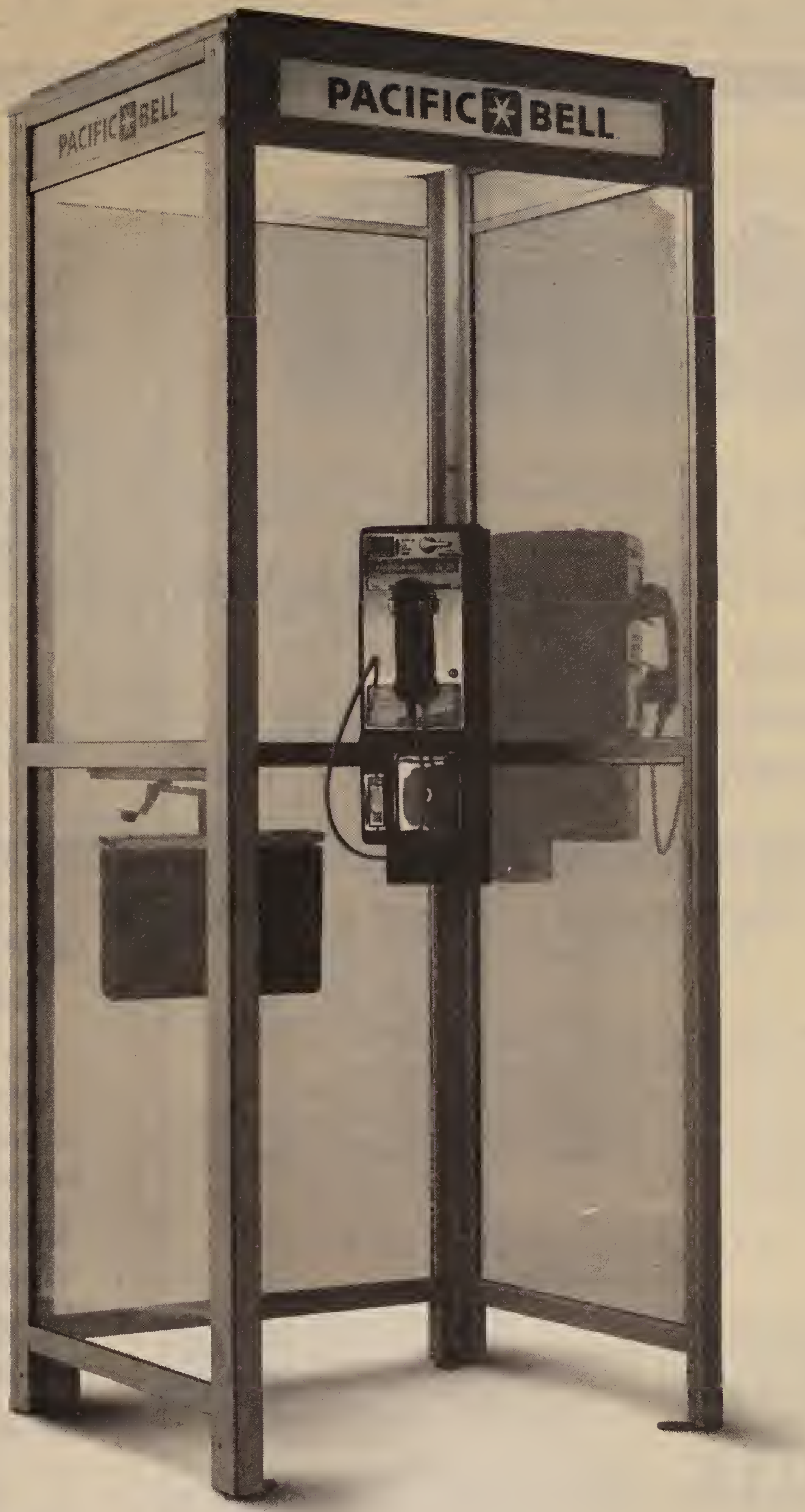

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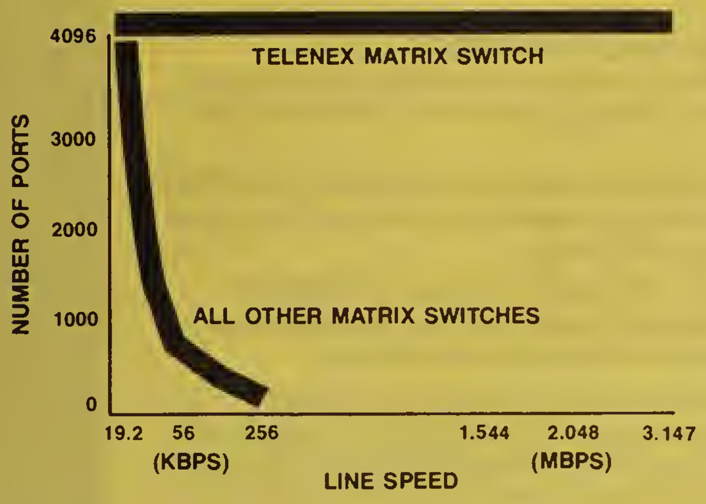

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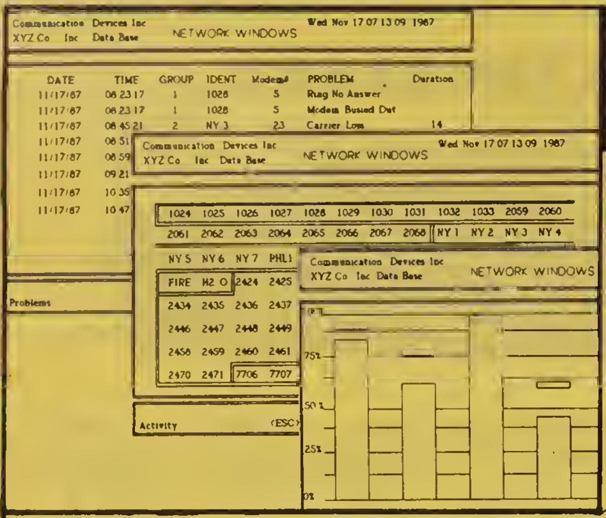

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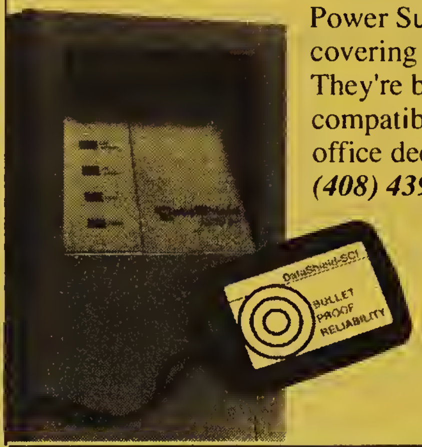

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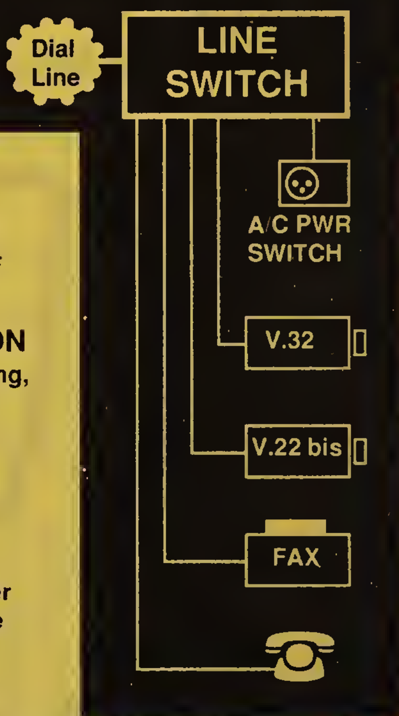

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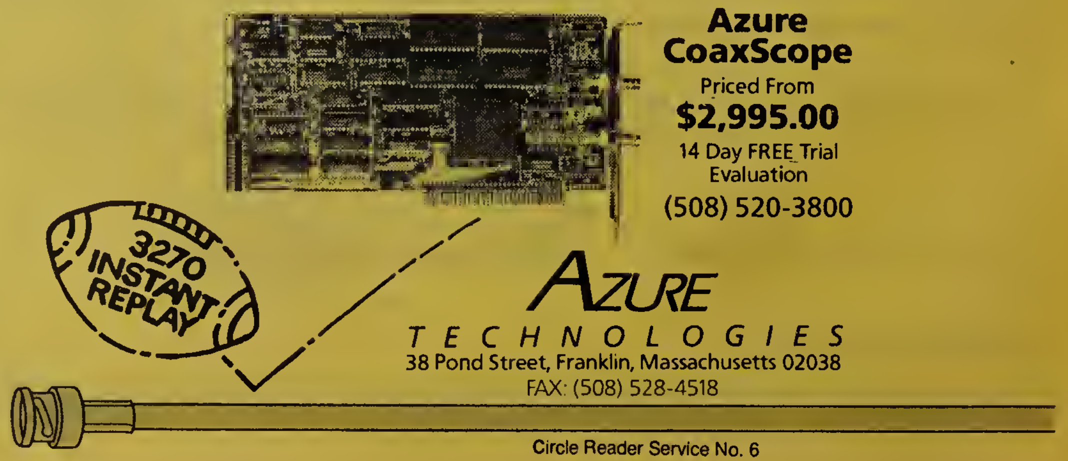

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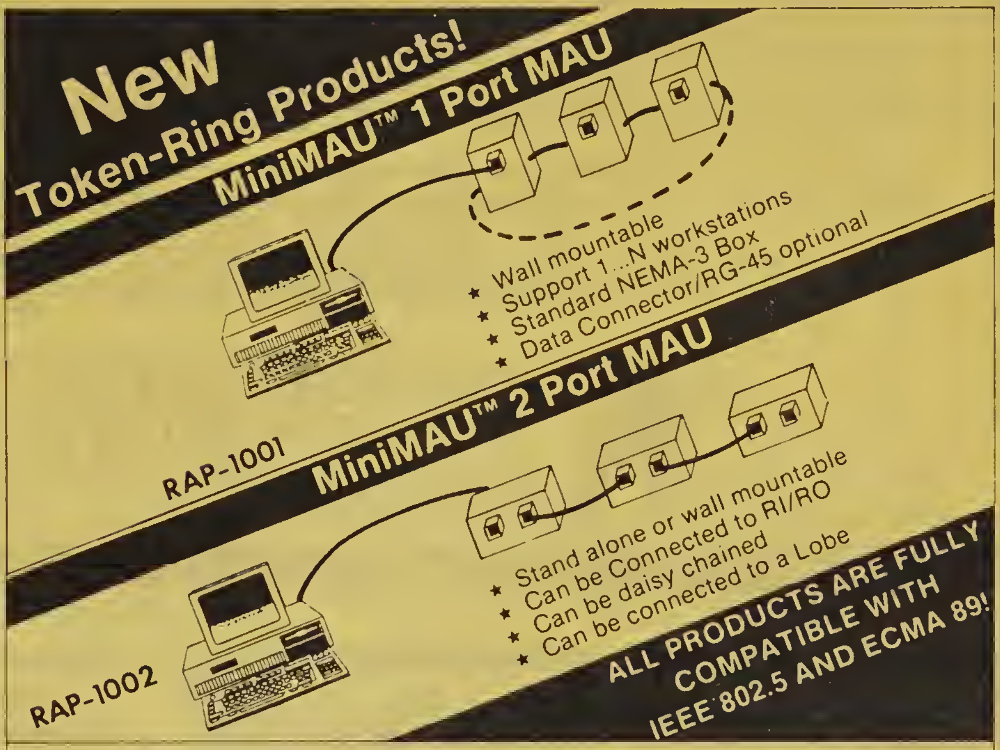

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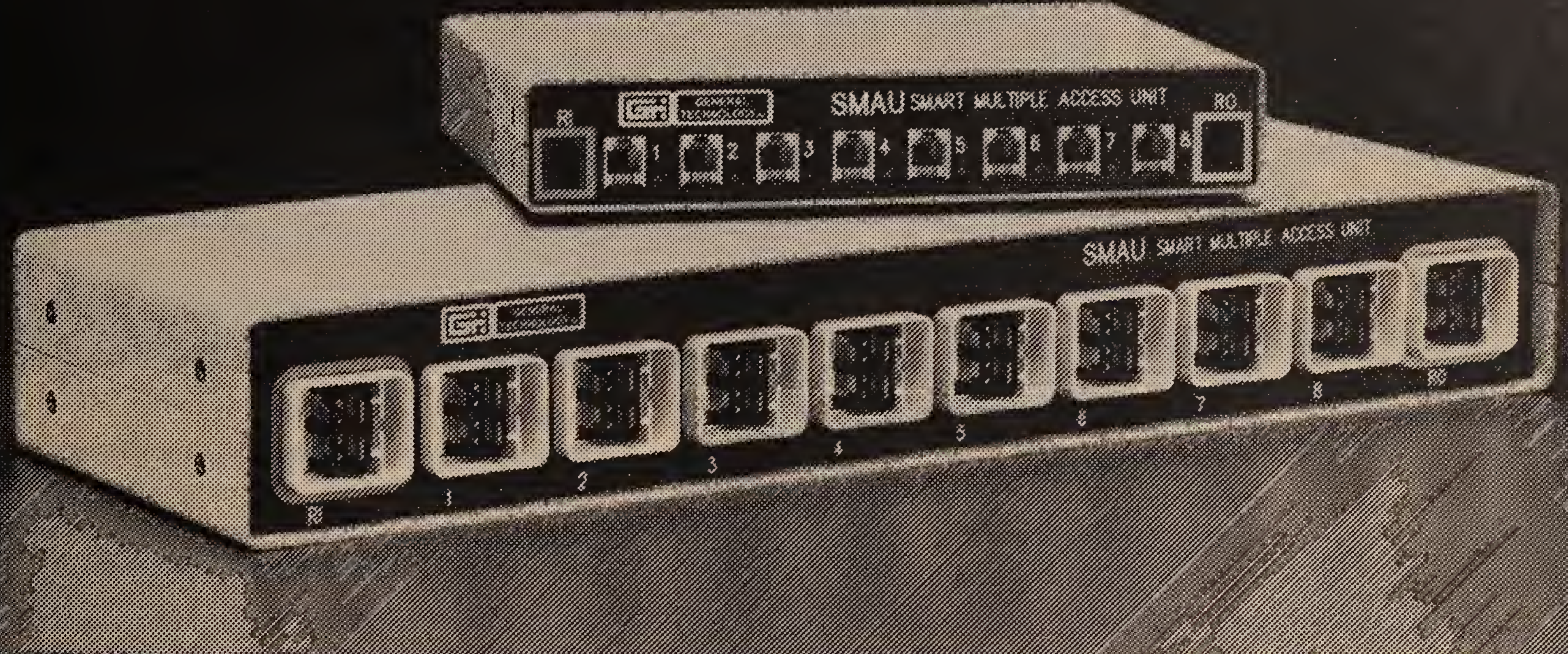
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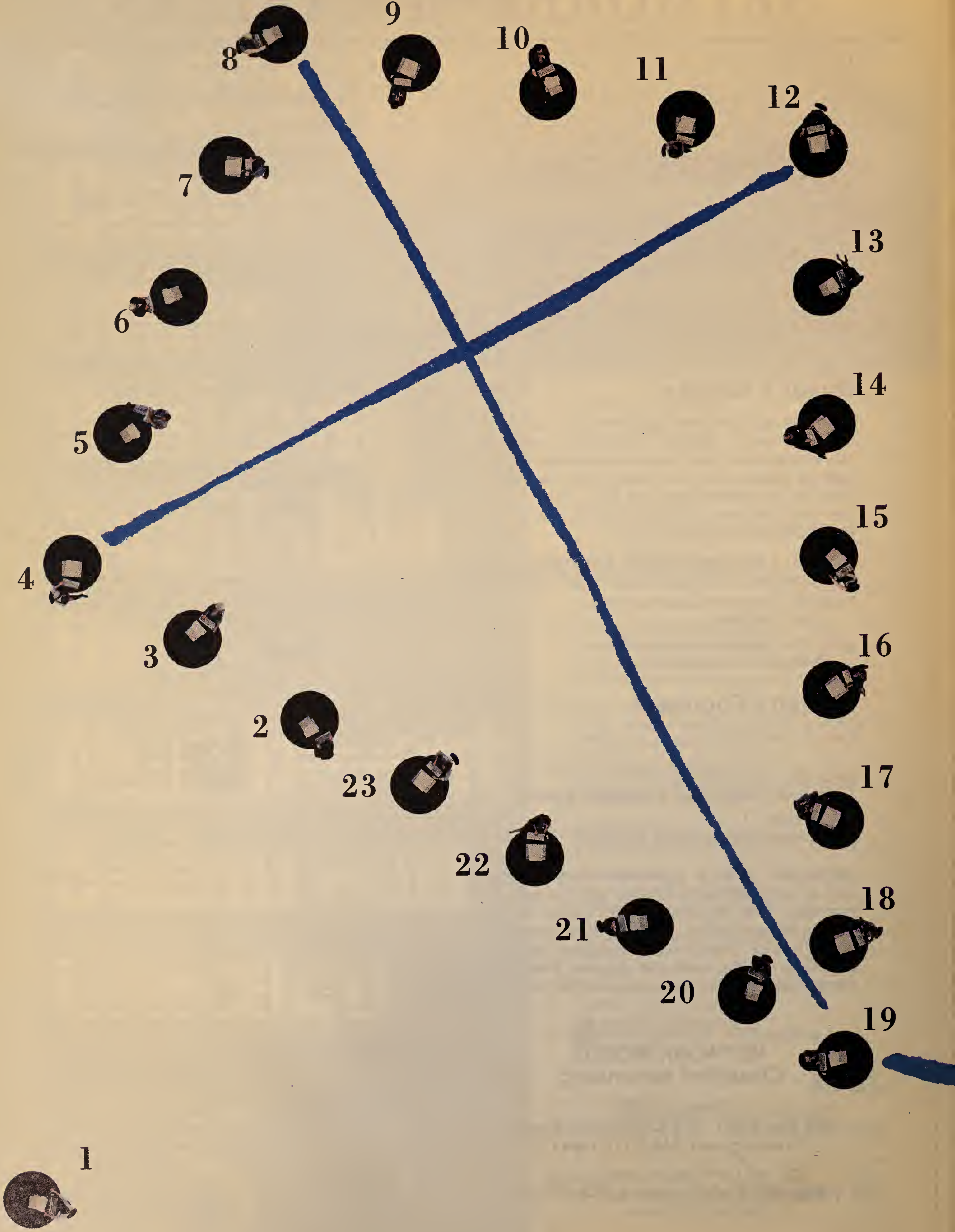
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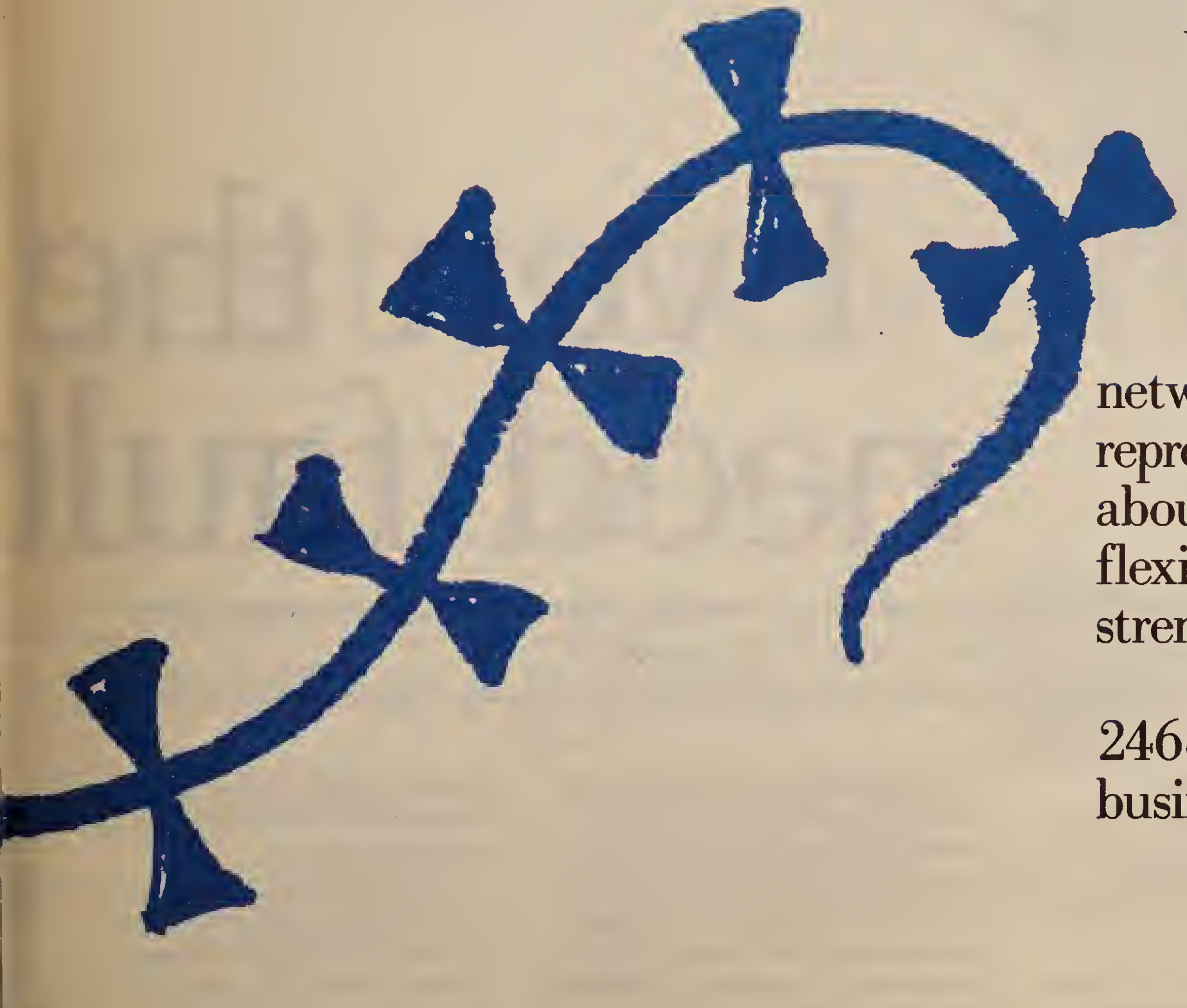

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Radio days

continued from page 41

other users without requiring traditional frequency coordination or government licensing.

Spread spectrum

Conventional narrowband radios concentrate their transmitted energy on a specific frequency. In contrast, spread-spectrum radios intentionally occupy a wide bandwidth — wider than the bandwidth of the information being transmitted (see figure, page 75). They use a high-speed, pseudo-random binary code, which makes the radio signal hop from channel to channel at a high speed.

Alternatively, the code may be combined with the information to be transmitted. This latter method is known as direct-sequence spread spectrum. Hybrids of the two approaches are also possible, but direct sequence is used in the commercial products to date.

The spread-spectrum signal is more immune to interference, reflections and disturbances than the conventional radio signal. Spread spectrum's attraction for military use is that it is almost impossible for an enemy to jam the signal. In fact, it can be hard to detect the signal.

To all but the intended receiver, spread spectrum is typically indistinguishable from ordinary environmental radio noise. Even if they could detect a signal's presence, eavesdroppers are confronted with billions of possible codes and complex modulation schemes that make interception impractical.

The spreading characteristic means that many users can operate in the same frequency band at the same time without interference. Through digital signal processing, spread-spectrum systems can use low power levels yet obtain a greater, more reliable range than would otherwise be possible.

Commercial spread spectrum was illegal until 1985, when the FCC promulgated rules to authorize its use. Deliberately taking a cautious attitude, the commission decided to allow spread spectrum only at a very low power level — one watt — in the frequency bands 902-928, 2,400-2,483.5 and 5,725-5,850 MHz.

Permitting a higher power level would have increased the range of radio LANs from hundreds to thousands of feet or even several miles. Fortunately, repeater stations can increase range without the need for high power.

Spread-spectrum technology can provide the benefit of higher power without actually requiring the sender to use high transmit power. Permitting a higher power level might have upset influential broadcast and mobile radio trade associations concerned about interference to their operations from the new technology.

Positive effects

All of the products described in this article use a combination of spread-spectrum and packet radio techniques in the 902-928 MHz frequency band. This band is also home to radar and various noncommunicative industrial and medical RF equipment, such as heat-sealing machines and therapeutic devices.

The FCC decided that spread spectrum could coexist with these other technologies if restricted to low power levels. It decided not to require licenses for spread spectrum, thus overcoming one of the objections that had been hampering the deployment of conventional radio data equipment. The agency implied that it would address issues such as licensing, interference protection and higher power for spread spectrum in the future.

So far, the FCC has not returned to those issues. This year, however, the commission took two actions that should have positive effects on the spread-spectrum market. In April, the FCC decided to allow repeaters to extend the range of low-power communications devices, including spread spectrum, as part of a general deregulation of unlicensed RF devices.

In August, the FCC moved to permit wider bandwidths for frequency-hopping systems — increasing bandwidth from 25 kHz to 500 kHz — and attempted to more precisely define its spread-spectrum requirements.

The commission's intention in these actions, says FCC engineer David Means, was to make it more feasible to develop and market digital LANs for personal computers. The widened bandwidth will facilitate greater capacity data transmissions and may also enable greater development of multiplexed voice over spread spectrum.

Exotica

AT&T, Bell Communications Research and laboratories at the Bell operating companies continue to put substantial research and development effort into various architectures for indoor wireless voice and data systems. This research concerns optimization of multiple-access protocols, modulation and signal propagation in buildings.

BELLCORE engineers envision a "Universal Digital Portable Communications" scenario, in which local telephone exchanges gradually migrate from wire-based to radio-based distribution to homes and businesses. Low-power base stations in buildings and neighborhoods would link to central offices via fiber optics or digital copper lines. Portable computers and digital telephones would work anywhere in buildings or outdoors through microcellular networks.

Exotic as it may sound, European firms are aggressively pursuing this scenario of wireless private branch exchange and cordless public telephony.

Two standards are currently competing for acceptance among European Community nations. British Telecommunications PLC has developed Cordless Telephone 2 (CT-2), which will be deployed in Britain in the form of a cordless pay telephone network. The rival Digital European Cord-

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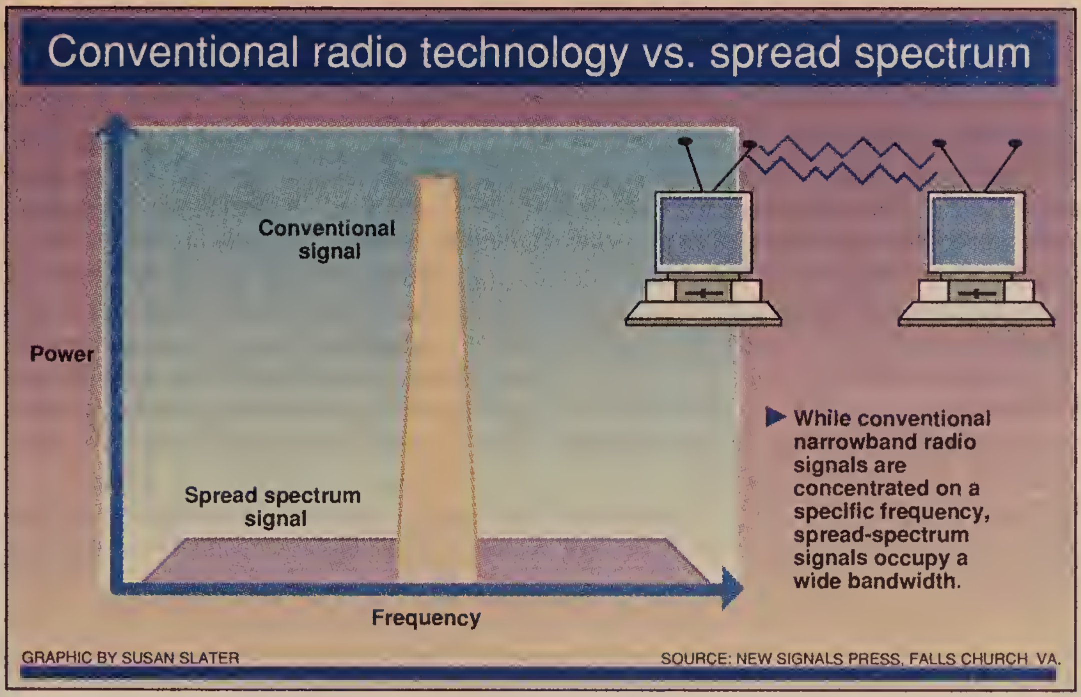
Conventional radio technology vs. spread spectrum
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Spread spectrum signal
Frequency
▶ While conventional narrowband radio signals are concentrated on a specific frequency, spread-spectrum signals occupy a wide bandwidth.

GRAPHIC BY SUSAN SLATER

SOURCE: NEW SIGNALS PRESS, FALLS CHURCH VA.

less Telephone standard is expected to be used in indoor wireless PBX applications in the early to mid-1990s.

Within the Institute of Electrical and Electronics Engineers, the 802.4L committee is devoted to wireless token-bus access. The committee originally formed as a result of encouragement from General Motors Corp. to extend the Manufacturing Automation Protocol by providing wireless links for mobile robots.

Committee member Chandos Rypinski of Local Area Communications Equipment of Petaluma, Calif., said he believes that focused standards are critically necessary for any expansion of radio-based LAN data rates and Integrated Services Digital Network capabilities beyond those afforded by the current FCC regulatory scheme.

"There is an agenda for those organizations that wish to participate in this business area," he says. "An industry effort is necessary to develop an air interface standard for a ubiquitous wireless access network to encourage development of the technology and to present a unified position to the FCC to obtain formal recognition of the frequency use."

Any large increase in the use of spread spectrum or other radio technologies for advanced ISDN voice and data wireless LANs and PBXs will require additional radio spectrum. In the U.S., there are several independent paths through which such spectrum could be obtained.

Empty frequencies

In 1986, after years of contentious legal proceedings, the FCC allocated 2 MHz in the bands 901-902 and 940-941 MHz to a General Purpose Mobile Radio Service (GPMRS). The commission declined to specify the nature of the GPMRS, preferring to leave such decisions up to the marketplace. To this day, there are no service rules, no licenses and no use of these prime frequencies.

An organized industry campaign could persuade legislators to pressure the FCC to allow radio-based LANs into this spectrum. Unfortunately, 2 MHz is probably inadequate for highly advanced systems unless modulation and coding technologies that could make efficient use of this relatively small amount of spectrum are developed.

As an alternative to making new spectrum allocations, the current FCC prefers that radio-based LANs and similar radio networking innovations be placed within the existing cellular RFs. In this scenario, radio-based LANs and wireless PBXs would share spectrum with car phones, raising the possibility of struggles for economic and technical control.

No commercial systems use this cellular sharing approach yet. The Canadian Department of Communications, however, will supervise experiments of CT-2-type systems within the cellular bands over the next two years.

Finally, a bill circulating in the House of Representatives would direct the U.S. government to divest a large portion of the radio spectrum currently devoted to federal agency use. Under the Emerging Telecommunications Technologies Act, the Department of Commerce would evaluate government spectrum needs and make underutilized frequencies available to the FCC for reassignment to the private sector.

The bill requires that at least 200 MHz be reassigned. Such an influx of spectrum would have phenomenal economic implications, and it is reasonable to expect that at least some of it would eventually be dedicated to radio-based LAN systems.

Wireless LANs are only now coming onto the market in significant numbers and choices. Before committing to that especially remote or cumbersome cabling installation, network managers should consider whether wireless methods will meet their needs.

LANs intended specifically for peripheral sharing and brief electronic mail messages are clearly good candidates for wireless methods. LANs that involve lots of file sharing, remote data base queries and online group brainstorming may be good candidates if the network is carefully planned and makes use of radio LAN equipment specifically intended for use with file servers and extensive networks.

In any case, the growing availability of high-speed equipment and FCC rule changes should promote increased adoption of the wireless alternative.

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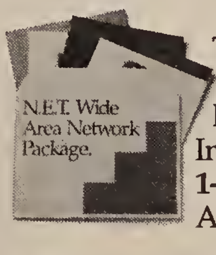
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New realities for ISDN

continued from page 61

provide a capability that is better than "being there," so that even if you were there, you might still want to use it.

Picture several users in a conference room discussing a document on the table. It could be difficult to refer to specifics within the document since the paper is upside down to the people sitting across the table.

A vivid example of this scenario occurred during the Iran/Contra hearings, when Arthur Liman and Oliver North tried to direct each other's attention to specific passages in the documents they both had in front of them.

In this instance, they would have found the Videodesk capability useful.

Another case in which the capability would be useful both in person and telephonically would be during a presentation. The ability to point to projected visuals and have random access to a data base of such visuals in response to questions, without giving up the floor, is desirable. This capability has been implemented in Videodesk.

Videoplace

Videodesk technology exists in a more extensive form called Videoplace, which has broad implications for telecommunications in business and entertainment applications.

In the complete Videoplace environment, the participant's entire body can be seen by the computer and is displayed on a large video projection screen. All of the capabilities of the Videodesk are available in the Videoplace.

In addition, the image of the user's entire body can now appear in a graphic world inhabited by graphics, creatures, people and other images.

The human image — or any other — can be manipulated by the computer as if it were a graphics object. It can be moved, scaled and rotated in real time. One person can appear to be very large while a second is very small, enabling one to pick up the other. Imagine an architect guiding an audience of structural, mechanical and communications engineers in different cities through a proposed industrial park, building by building and room by room. The park exists as detailed 3-D CAD images in a computer.

The architect can walk through each image, pointing out items and areas of interest to the audience. The audience can ask questions, using the Videodesk capability to point out areas of discussion or enter the Videoplace environment themselves to follow the guide through the park. The opportunity exists to create a complete universe tailored to your needs, and the entertainment opportunities are almost boundless.

Just as the image of the user's hands could be compacted with Videodesk technology, the image of a participant's full body could be compressed to fit within the ISDN B channel with updates 15 times per second. A cruder approximation could be transmitted 30 times per second.

Limited interaction would be possible over the ISDN D channel or even existing analog lines.

In the latter case, movements of each part of the user's body would cause a different part of the graphics "puppet" image to move. This graphics puppet need not be anthropomorphic; it could be anything from an amoeba to a spaceship.

> The human image can be manipulated by the computer as if it were a graphics object. It can be moved, scaled and rotated in real time.
>
> ▲▲▲

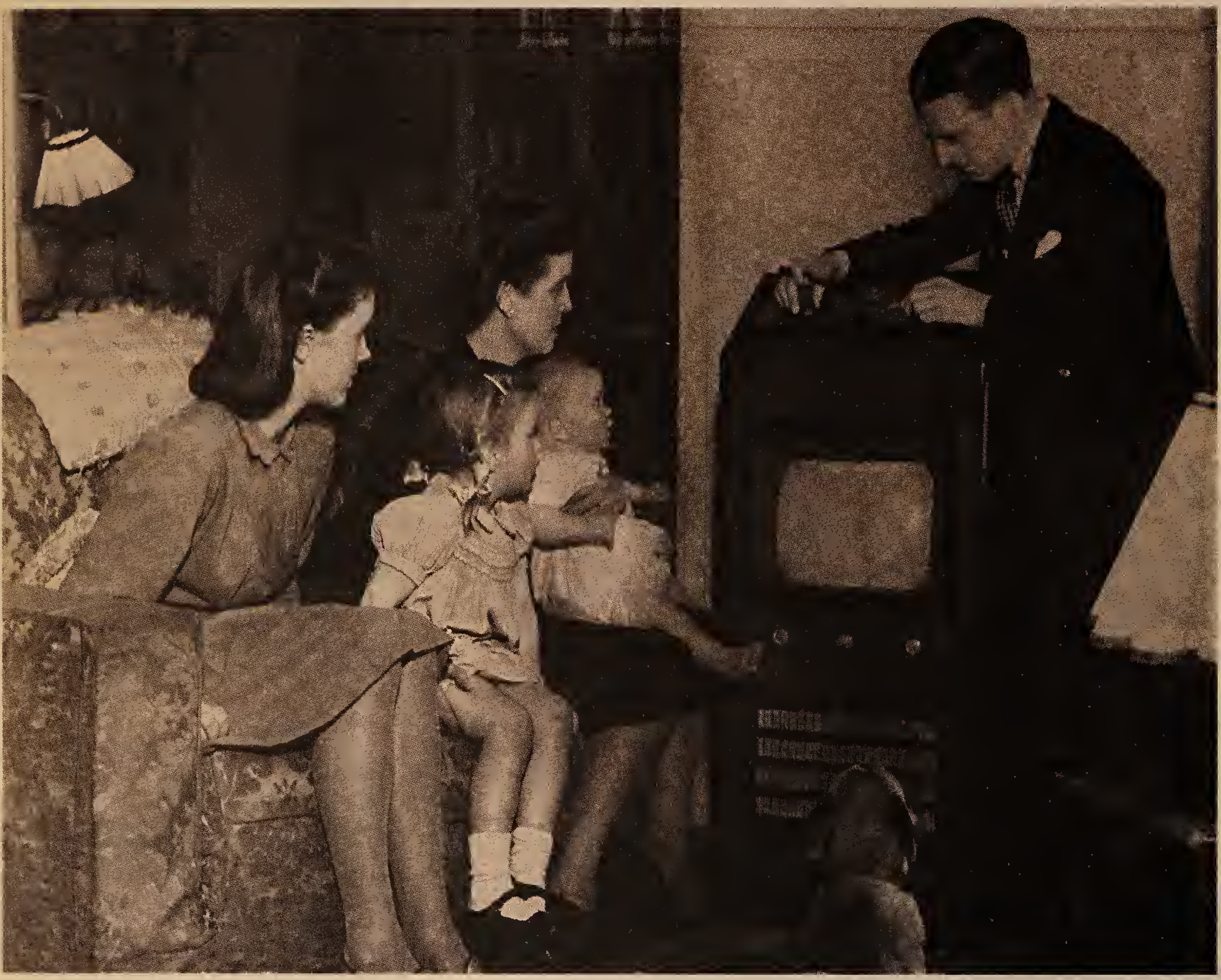
At the other extreme of transmission bandwidth is the 4G bit/sec predicted by Wayne Wilner of Bell Communications Research for the fiber-optic service to the home of the future, permitting full high-definition television color images to be used.

Future realities

Low-bandwidth Videodesk teleconferencing whets the appetite for the services that fiber optics and ISDN will eventually bring. Greater bandwidth will provide the ability to dispense with data compaction, leading to a more realistic portrayal of the participants and, if it's economically desirable, centralizing the processing capability. With individual Videoplace environments, local users could take advantage of the processing power owned by local telephone companies and computer service bureaus to participate in conferences, visit distant locales, develop applications beyond the capability of a personal computer and even participate in interactive video games tailored to the user's every whim.

Telephone companies or cable franchisees could make Videoplace available on a subscription basis.

Individuals or organizations could purchase Videoplace environments and simply pay for the use of the services as we now do with the telephone network or cable TV. It may be that the public telephone network evolves to become not just a basic medium for voice communications, but a universal video arcade with a rich variety of communications modes that can be used to provide entertainment as well as to meet business communications needs. ■



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Next LAN Mgr. to debut

continued from page 1

Version 2.0 is scheduled to ship around the first of the year and will be offered in 10-user and unlimited-user versions.

The net operating system can address up to 4G bytes of system memory and will support files of up to 2G bytes and as much as 48G bytes of on-line disk storage, the OEM said. OEMs will set product pricing individually.

Analysts are taking a wait-and-see attitude toward LAN Manager 2.0's chances.

"They're headed in the right direction," said Mary McCaffrey, an analyst at C.J. Lawrence Associates in New York. "They've got a good strategy in place, and now the challenge is to execute it."

John McCarthy, an analyst at Forrester Research, Inc. in Cambridge, Mass., added that "Both Microsoft and 3Com are on the ropes since LAN Manager 1.0's functionality and sales have fallen so short of expectations."

Enhancements

With LAN Manager 2.0, Microsoft has corrected many of the deficiencies that plagued the initial 1.0 version. The size of the DOS workstation shell, including Named Pipes support, has been reduced from about 150K bytes to less than 100K bytes, leaving users more than 500K bytes for applications.

Another enhancement is SFT in the form of disk mirroring. This feature enables the server to create a redundant set of files on a second disk to ensure that net operations will not be disrupted in the event of a disk failure.

"Besides SFT, LAN Manager 2.0 will include a drive-duplexing capability that backs up the disk controller in case of failure," Kessler said.

LAN Manager 2.0 also contains significant network management capabilities that enable system administrators to manage groups of servers, or server domains, as though they were a single server. This capability obviates the need for the network administrator to update individual servers as new applications or users are added to the network.

Microsoft has also beefed up the inherent security features in Version 2.0 by allowing network administrators to set password lengths and determine how often users must change passwords.

System administrators will be able to encrypt user logons and defend against system break-in attempts that use programs that keep trying different passwords until they find a match. The mechanism denies access when it detects multiple logon attempts.

In addition to the new features, one of the most important enhancements in LAN Manager 2.0 is an I/O subsystem that contains a superset of the high-performance file system introduced in LAN Manager 1.2. In this superset, the server handles file I/O in 32-bit mode, compared to 16-bit mode, and makes use of more intelligent disk caching to achieve greater throughput.

The net result is that LAN Manager can now achieve server throughput limited only by the bandwidth of the disk and network I/O interfaces.

While LAN Manager 2.0 has more features and improved performance over Version 1.0, it still comes up short in several key areas, said John Dunkle, vice-president of work group computing at Work Group Technologies, Inc. in Hampton, N.H.

Features missing from LAN Manager 2.0 include directory services, such as X.500, and a global naming facility similar to Banyan Systems, Inc.'s VINES StreetTalk.

"X.500 and a global naming facilities are requirements that users have specifically asked us for, and they are features that will definitely be included in a future release of LAN Manager," Kessler noted. Sources said a facility similar to Banyan's StreetTalk will not be included in the next release of LAN Manager and is at least a year away.

Analysts said that LAN Manager's chances of success or failure hinge on more than just current features and functionality.

"LAN Manager 2.0, for all the new improvements, does not mean anything to users until the applications are on the street and in users' hands," said Doug Gold, manager of communications industry research at International Data Corp., a market research firm based here. "And we're probably six months to a year away from volume shipments for most LAN Manager [2.0] applications." ☐

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Wall Street to clamp down on net trading

continued from page 2

competitiveness of U.S. markets for raising capital.

After last month's minicrash, Kidder, Peabody & Co., Inc.'s 1,400 brokers launched a successful campaign to get their company to halt program trading.

But others on Wall Street, mainly high-tech traders and their pension fund clients, say program trading is being made the scapegoat for larger problems. They say speculation on corporate takeovers, among other things, is more to blame for instability than program trading.

At the root of the controversy are computer networks that enable traders to execute automatic trades of millions of dollars worth of securities in multiple markets throughout the country.

In the most publicized form of program trading, stock index arbitrage, traders use computers to monitor the prices of stock indexes and stock index futures. When there is a temporary divergence in the prices of the indexes, the traders automatically transmit buy and sell orders via a network to different markets. The traders profit by buying in whichever market is cheaper and selling in the more expensive market.

The networks that make such transactions possible were built by the exchanges and securities firms beginning in the mid-1970s. In 1976, the NYSE built the Designated Order Turnaround (DOT) System, an automatic order processing network. Prior to DOT, traders would write out paper orders and run them to the floor of the exchange. A faster system, called SuperDOT, was installed in 1984.

The DOT network was intended to speed delivery of normal-sized orders to the exchange floor, according to Allan Grody, president of Financial InterGroup Holdings, Ltd., a management consulting firm here. ''It started out to help the small investor place orders on the market faster, but it quickly became used much differently,'' he said.

The change came when the Chicago futures markets began offering a stock index product that allowed investors to engage in stock index arbitrage. Critics of program trading say this gave rise to a ''gambling mentality'' in which traders began trying to profit from temporary divergences in the price of equity and futures indexes instead of investing in securities on the basis of corporate value.

Despite the outcry, many believe program trading is here to stay.

''Program trading won't disappear, but I suspect it will be tamed,'' said Charles Doherty, president of the Midwest Stock Exchange, Inc. in Chicago.

Doherty said program traders perform a legitimate function in the market: They permit legitimate investors, such as pension fund managers, to adjust their portfolios at a lesser cost and in a shorter time than otherwise possible.

John Phelan, chairman of the NYSE, last week said program trading ''won't go away,'' but that he was taking steps to curb the practice. ◘

Attendees put MAP on back burner

continued from page 2

showed how a mythical tractor company could use CIM to quickly manufacture an out-of-stock part by sharing information on computers in three offices.

The show's organizers deliberately chose not to use MAP products in the CIM network, instead employing token ring, Ethernet, Digital Equipment Corp. DECnet products, TCP/IP and multiple gateways.

''We were told only to use off-the-shelf products, and there simply weren't enough off-the-shelf MAP 3.0 products to make the technology feasible to use,'' said Bruce Gengler, project manager with Moline, Ill.-based Deere Technical Services, which the Society of Manufacturing Engineers (SME) hired as lead systems integrator for the project. The SME sponsored Autofact.

Gengler added that had the exhibit been held in ''another two or three months,'' enough MAP 3.0 products would have been available to make use of the technology practical. He said he regretted not being able to use MAP since the technology would have ''made the exhibit more efficient'' by reducing reliance on costly gateways and increasing peer-to-peer communications.

But users who toured the exhibit didn't seem disappointed.

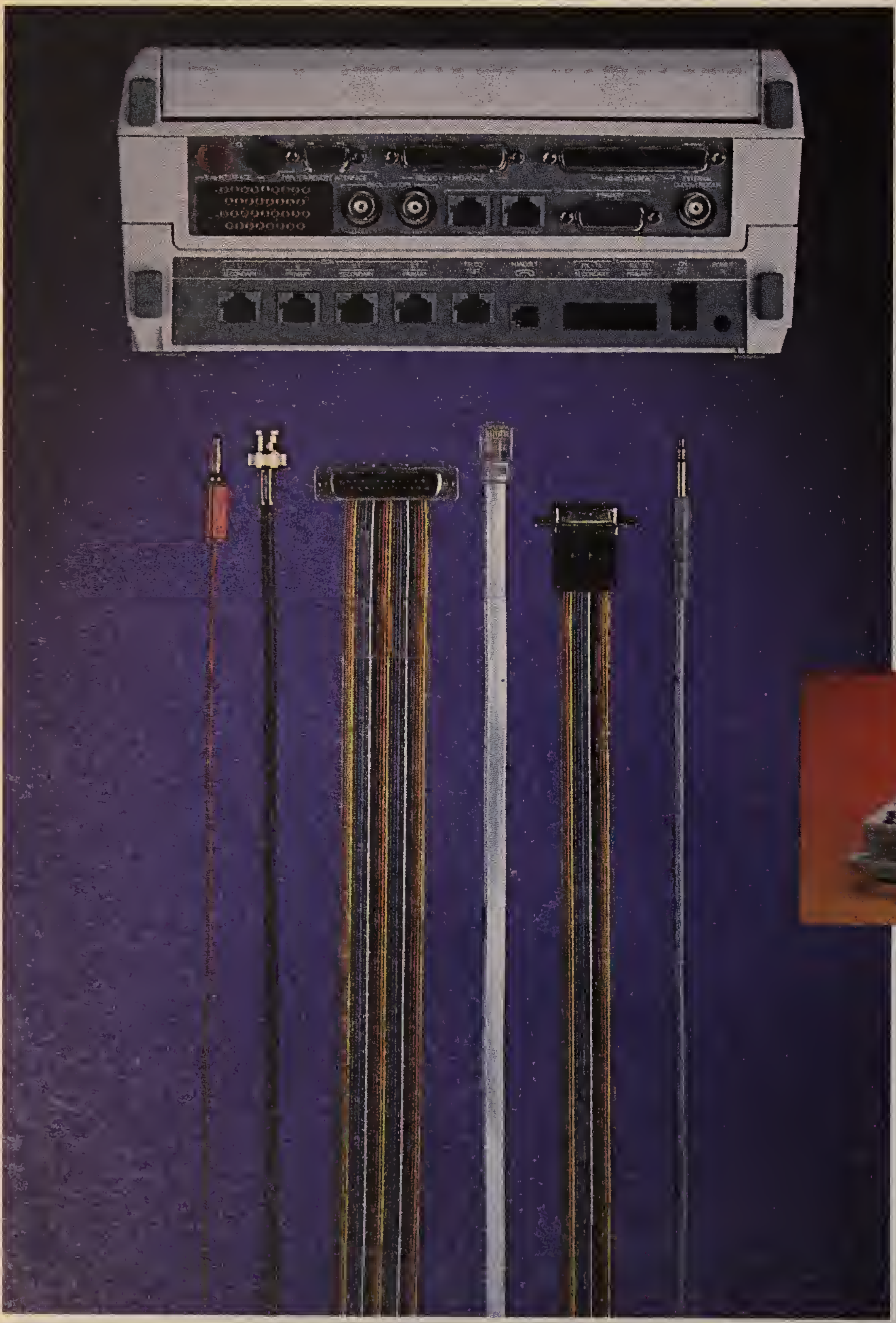
''I need to see what I can do now, not one or two years from now,'' said Don Thackrey, manufacturing engineer at Sacramento, Calif.-based Aerojet General Co.'s TechSystems division, a subsidiary of GenCorp, Inc.

''This exhibit did a good job of showing me what technology can do today. It didn't need to show MAP,'' added Virgal Fields, technical support team leader for integration at the Cincinnati-based Aircraft Engines division of General Electric Co.

Several users said their primary concern isn't figuring out how to implement MAP, but persuading upper management to build CIM networks in the first place.

''Upper management typically doesn't care about MAP vs. any other kind of network technology,'' said Landon Miller, a principal in the Seattle office of consulting firm KPMG Peat Marwick. ''Trying to convince management to commit to MAP can make them scared to build a [CIM] network in the first place.''

Miller said that expanding network connections among a company's different business units, as well as between its suppliers and customers, is vital to making a CIM investment pay off. He said that management at many companies doesn't realize this. ◘



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3Com unwraps network control

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LAN Manager product right now, but the company's position as Microsoft's codeveloper and favored LAN Manager licensee has clearly eroded in the past year.

There are persistent rumors that slow LAN Manager sales have persuaded Microsoft to take matters into its own hands and sell the product directly. From the forum podium, Burton said he was convinced the rumors are true.

Benhamou agreed that Microsoft will do whatever it thinks is necessary to ensure the success of LAN Manager. "It is clear that Microsoft's No. 1, No. 2 and No. 3 goals are to make LAN Manager successful, almost at any cost. It's an issue of operating system industry dominance in the 1990s."

3Com's position is that there is a growing gap between the core LAN Manager network operating system, and network services and applications. Once the core operating system stabilizes, it could become a commodity like DOS. At this point, it might make sense for Microsoft to distribute a standard core product, Benhamou said. By then, the focus of networking issues will have shifted to applications, which is "where we plan to be," he said.

Network management is a key application area, and 3Com used the Network Systems Forum to demonstrate the first fruits of its new Open Management Architecture (OMA). The architecture will enable the company to build software to manage 3Com products and, ultimately, all third-party products that support one of several standard network management protocols: Simple Network Management Protocol (SNMP), Common Management Information Protocol (CMIP), CMIP over TCP/IP (CMOT), NetView and the emerging IEEE 802.1 standard for media-access control net management protocols.

The company showed an OS/2 network management application running under Presentation Manager on an IBM Personal System/2. It used SNMP, CMOT and 802.1 to gather data from devices on a multivendor exhibit floor network and fed the statistics into a spreadsheet for analysis via Microsoft's Dynamic Document Exchange (DDE) facility. Scheduled for release in the second half of 1990, the product will be able to forward alerts to IBM's NetView.

"Our customers want it right now, of course, but it takes time to get the agent software into all the managed objects," said William Littman, director of network management at 3Com. "But we're encouraged by the fact that this prototype has run for two days here without crashing."

Customer demand also forced 3Com to jump the gun a bit and start rolling out a line of Ethernet products that use unshielded twisted-pair wire before the 10BaseT standard is set in stone by the IEEE. "We felt the risks were low enough that we can guarantee compatibility" with the final standard, said Andy Verhalen, vice-president and general manager of 3Com's Transmission Systems Division.

3Com, which has the world's largest installed base of Ethernet adapters, was one of the key network vendors that criticized SynOptics Communications, Inc. when it rushed to market with a prestandard twisted-pair product more than two years ago. Now SynOptics dominates the market, and 3Com has to build downward compatibility with SynOptics' LattisNet into its new 3Com 10BaseT products, which are scheduled for release in March 1990.

Standards groups set specs

continued from page 8

that a joint specification was the best solution.

"It made sense to collaborate and try to produce something together that fits all of our needs, rather than each of us going our own separate ways," said John Morris, software engineering manager for OSF, based in Cambridge, Mass.

Morris said OSF wants to have the joint specification completed by January or February. OSF and the other organizations will then design test systems conforming to the document. OSF hopes to deliver such a product in the second quarter of 1990, Morris said, and X/Open's VSX is expected to meet the specifications.

X/Open officials could not be reached for comment.

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Insurer gets service edge

continued from page 1

and other insurance companies, 6,000 terminals and some 75 million monthly transactions.

Progressive Casualty's first step in building its claims processing network, dubbed Progressive Automated Claims Management (PACMan), was to construct a T-1 backbone early last year. The backbone, which supports both voice and data traffic, links the firm's divisional headquarters across the country to its main headquarters here.

Progressive Casualty uses T-1 links from Williams Telecommunications Group, Inc. (WTG) and fractional T-1 links from both WTG and Cable & Wireless Communications, Inc. The insurance company saves about half a million dollars a year by using T-1 and fractional T-1 links rather than lower capacity services such as dedicated 56K bit/sec lines, Bradner said.

Progressive Casualty uses 9.6K and 14.4K bit/sec multidrop data lines from MCI Communications Corp. to tie into a backbone. That backbone supports its nearly 190 local claims offices and roughly 20 other offices, including banks and insurance companies with which the insurer conducts joint marketing.

PACMan, which was completed during the summer, is designed to help Progressive Casualty's claims agents quickly process some 300,000 claims a year. The network boasts an average response time of 1.12 seconds, down from a response time of about two seconds before the net overhaul.

The claims processing cycle begins when the customer calls into Progressive Casualty's nearest divisional headquarters office via an 800 number to, for example, report an accident. The divisional offices have hundreds of agents and can more efficiently start the claims process than a local office with a smaller staff.

A customer service agent keys information about the customer's accident and policy into an IBM 3192 terminal and then transmits it through an on-site IBM 3174 controller across the backbone to an IBM 3090 running MVS/ESA at Progressive Casualty's information services headquarters.

Host software designed in-house reviews the data and alerts a local agent that a customer in that agent's area has filed a claim.

The local agent then would notify the customer to inspect the damage. Once done, the agent inputs the report into a 3192 terminal and uploads it to a data base on the IBM 3090 at headquarters to determine how much coverage Progressive Casualty will provide. A check is then processed and delivered to the customer.

The process has significantly cut the time an agent takes to process a claim. In the past, agents often relied on mailing reports between offices and corporate or divisional headquarters. PACMan enables agents not only to serve customers better, but gives them time to serve more customers.

"The faster you can close a claim in this business, the more profitable you are because you can move onto the next customer," Bradner said. "Our emphasis is on customer service. We want a happy customer base that will come back and ask us to underwrite more policies."

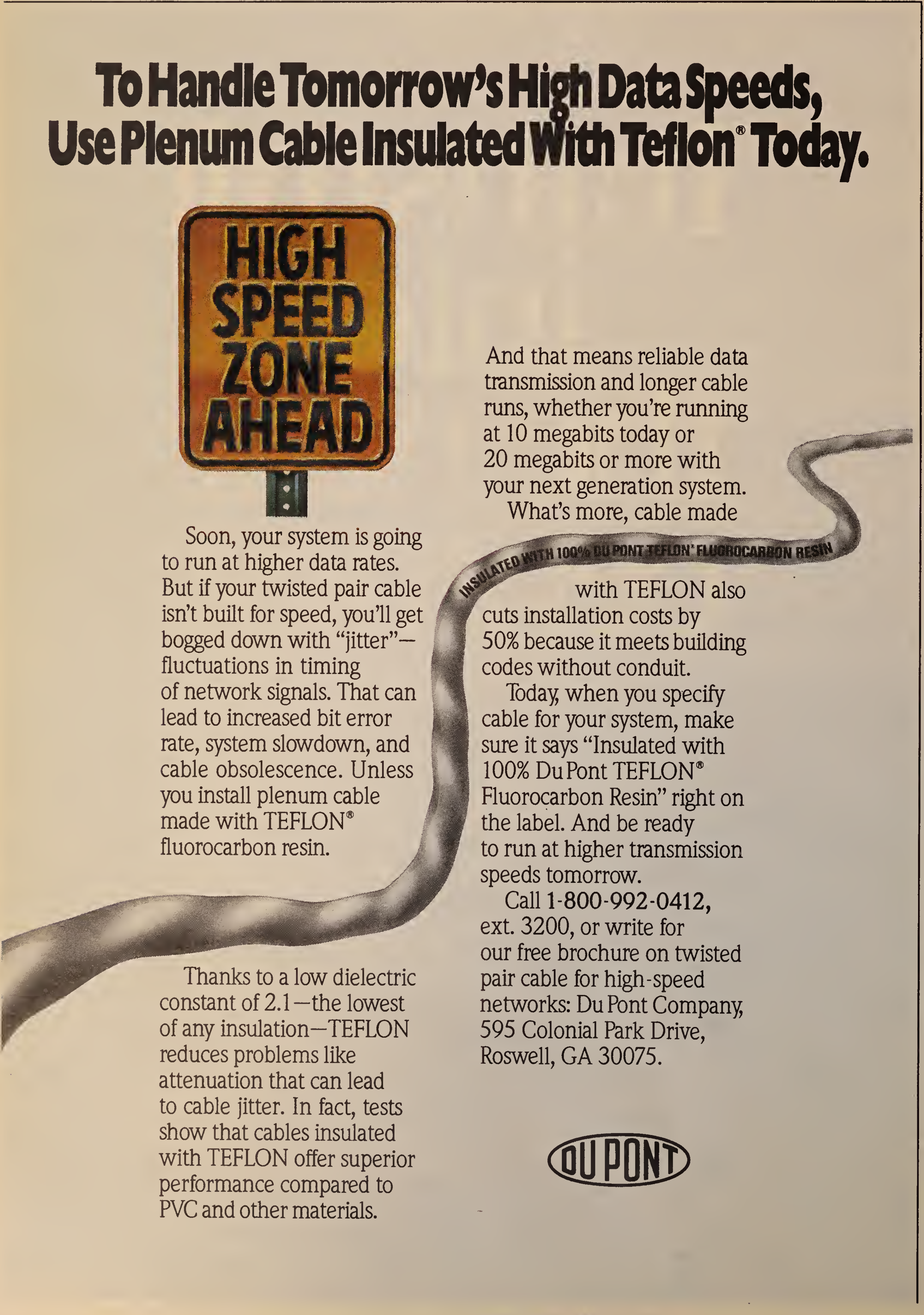
To support the voice needs of its remote offices, Progressive Casualty signed on for MCI's 800 services and Vnet service under a $27 million, three-year deal announced in May. MCI's Vnet service alone is saving the insurer $4 million a year over the hodgepodge of services it used in the past from MCI, AT&T, US Sprint Communications Co. and others.

The cost per minute for using Progressive Casualty's network has dropped from 26 cents in 1987 before the network overhaul to about 14 cents this year, Bradner said.

Other network features include 800 number access for customers to a data base on a mainframe at Progressive Casualty's headquarters. By phoning into a voice response unit, customers can access policy data.

The next step in the insurance company's network project involves adding some 20,000 to 40,000 independent insurance sales offices onto the network. They will be linked via CompuServe, Inc.'s value-added data net under a Progressive Casualty program dubbed Superdisc.

The project will give agents instant dial-up access to billing and rate information, and let them prepare policies more quickly. ◻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User ties non-IBM devices to NetCenter

continued from page 1

nounce the NetCenter product, complete with all of the features, as we have it installed," Coffee said. "I think they would like to do that, but IBM has some pretty stringent product testing and validation standards that they go through to announce a product. Where they are with that, I'm not really sure."

An IBM spokeswoman confirmed that the company has been talking to Union Pacific about NetCenter but that IBM has also been listening to other NetCenter customers in an effort to determine their requirements for the product. IBM is currently assessing which functions it will include with NetCenter and expects to make an announcement about general availability in the near future, she said.

Links to Larse system

Union Pacific is using the NetCenter SPI Option to support a link to a Larse Corp. alarm system, which in turn monitors a multitude of equipment supported on the railroad's various networks, Coffee said. Those networks include a private microwave net, a fiber-optic network and a radio network for train control.

> "As alarms occur, we can see what their effect is on our network," Union Pacific's Coffee said.
>
> ▲▲▲

The Larse system monitors devices such as T-1 multiplexers and fiber-optic equipment, plus security systems and environmental monitoring devices located in remote, unmanned locations.

"Anything that's capable of generating an alarm or turning on a lightbulb can be monitored by the Larse system," Coffee said.

The Larse software runs on three Hewlett-Packard Co. HP 1000 minicomputers at the Union Pacific data center here. The HP 1000s are linked via 1,200 bit/sec lines to a Personal System/2 running IBM's NetView/PC (see graphic, page 1).

A homegrown NetView/PC application accepts alarms from the Larse system, converts them to NetView-compatible formats and sends them to VTAM running in the mainframe, which forwards the alarms to NetView, Coffee said. NetCenter has a mainframe-based component that sits between VTAM and NetView so it can see all the alarms that VTAM reports to NetView.

The SPI component is part of that mainframe-based NetCenter software. To recognize alerts from IBM devices, NetCenter reads VTAM definition tables to find out where the device resides in the net. Non-SNA devices are defined in a separate table produced from IBM's Information Management problem management software.

SPI reads the latter file to find out where the non-SNA device resides in the network and converts alarm data from the device into a format that can be understood by the graphic interface component of NetCenter, which runs on a DOS-based Personal System/2.

Union Pacific has 26 workstations configured as NetCenter consoles and six mainframes running the host software.

NetCenter has greatly increased the productivity of NetView console operators by providing a generic set of commands the operators can use to run NetView and support both SNA and, with the SPI Option, non-SNA devices.

Although control over non-IBM devices is limited at this time to features such as resetting alarms, Union Pacific is at work perfecting NetView/PC applications that will provide more control, Coffee said.

NetCenter also provides an easily understood graphic interface, he said.

"It allows us to see a graphic representation of our network," Coffee said. "As alarms occur, we can see what their effect is on our network.

"NetView is very complex and difficult to learn," he said. "[NetCenter] has allowed us to make our net control center people more functional early in their careers."

Union Pacific network control center operators monitor IBM NetCenter console.

But there are improvements Coffee would like to see in the product, including an OS/2 version. NSI was working on such a version — a project Union Pacific expected to help with — when the product was sold to IBM. Coffee said he talked briefly with IBM about its plans to produce an OS/2 version of NetCenter and said IBM is still investigating that possibility.

OS/2 would let network control center personnel use the same workstation to run NetCenter and to perform other functions, such as using an application that dials up remote devices to perform diagnostics. To skirt the limitations of DOS, Union Pacific is investigating other options, including development of an AIX-based system that would support NetCenter as a DOS task while also supporting other net management applications. ◻

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US West ups effort to sell recovery services

continued from page 2

vices is business continuation — not business as usual," said Tom Terry, Bell Atlantic's manager for disaster recovery.

"Most [users] are starting to realize there is a lot of competition and if customers can't reach you, they can reach someone else," Terry said.

Mark Lowenstein, a telecommunications analyst at The Yankee Group, a Boston-based market research group, said offering disaster recovery services makes sense for the RBHCs in light of increasing competition from alternate carriers such as Metropolitan Fiber Systems, Inc.

"This is a way for the Bell companies to offer the kinds of services customers had to go elsewhere to find," he said.

Above and beyond

US West's network contingency offerings — sold through US West Communications, Inc., a holding company for US West's operating companies — are designed for customers willing to pay for protection beyond what the carrier typically provides.

"Our network is efficient; we don't have tons of spare capacity to give every customer alternate access to a CO," said Robbin Frazier, US West Communications' project manager responsible for developing disaster recovery applications. "But some [users] are willing to pay extra to avoid a certain CO or for redundancy."

US West Communications already offers a variety of disaster recovery services that it will bring to customers' attention during its marketing campaign. The campaign began in September in Minneapolis and will extend to Denver, Portland, Ore., and Seattle this month. The carrier plans to unveil new disaster recovery services next year but declined to comment on them now, Frazier said.

US West Communications' existing disaster recovery services include provision of so-called self-healing, fiber-optic local loops. This service, which is currently being used by American Express Co. in Phoenix, automatically reroutes traffic in the event of a network or service disruption.

Other disaster recovery services include alternate routing to different central offices or to different interexchange carriers' points of presence, Frazier said. Services will help users circumvent network problems at the central office, the customer premises and in between, she said.

San Francisco earthquake rekindles concerns about disaster planning.

US West Communications' marketing campaign has targeted not only telecommunications and data processing managers but also high-level executives. Top executives have been targeted based on the notion that continuity planning should be part of an overall business contingency planning effort, said Mike Grandchamp, US West Communications' manager for advertising and promotion.

CommGuard

Bell Atlantic offers a few disaster recovery services — alternate routing to a primary central office and alternate access to a secondary central office — under its CommGuard service line. The carrier has three more CommGuard services scheduled for introduction early next year, Terry said.

The new services will include shared alternate access to a primary or secondary central office, which lets users lower the cost of disaster preparedness by sharing a backup line. This service is targeted to users in an industrial park or shopping mall. Another service would be provision of a telecommunications hot site similar to the hot sites supported by firms such as Comdisco Disaster Recovery Services, Inc. A customer could transfer its telecommunications operations to the hot site during an emergency.

Ameritech is also planning to roll out a number of disaster recovery services next year, said Kevin White, product director for digital transport services at the RBHC's Ameritech Services, Inc. division. For example, the carrier may allow users to pay a lower-than-usual price for a switched or dedicated backup link that would remain idle until a primary link was knocked out.

"The major concern customers have is 'Do I really need to pay for two links all the time?' " White said. "We suggest that customers engage in load balancing, where they have two fully operational links and split their traffic load over them. But we may offer alternatives." ◪

PacBell applies for conditional tariff

continued from page 4

Evans said. Once users become comfortable using Package A, they will move on.

"As customers become more familiar with [ISDN] technology, capabilities and applications, they will migrate to [Package B], which offers packet data transmission, and then on to the full ISDN functionality supported by Package C," she said.

Although interested in the ISDN service, some Pacific Bell customers have yet to identify applications that ISDN can enhance. "The pricing is somewhat favorable, [but] we don't have applications that can use ISDN right now," said Chuck Matthews, data processing manager for Great Western Bank, A Federal Savings Bank, located in Beverly Hills, Calif. ◪

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Audit Bureau of Circulations

MCI signs up K mart for Vnet

continued from page 3

Carlson agreed that MCI's ability to install the new service quickly was a selling point. With phone bills like K mart's, there's a lot of pressure to move fast when an opportunity to save money arises.

"We can measure in thousands of dollars the delay of a few days or a week," he said.

Brad Bishop, national account manager with MCI, said the carrier gave K mart a written guarantee that it could complete the installation in four months. Typical installation times for large Vnets range from 12 to 18 months, he said.

MCI was able to promise a quick turnaround because it spent about three or four months in advance of the award putting together a comprehensive profile of K mart locations, complete with traffic analysis and projections on savings, Bishop said.

Another selling point for MCI was its willingness to help K mart develop a specialized dialing plan for its stores, Kornfield said. Each K mart and Waldenbooks store has a four-digit identification number assigned to it. MCI set up a dialing plan in which all locations have a common three-digit prefix followed by that four-digit identification number.

According to Bishop, the dialing plan is very popular with K mart employees, such as merchandisers from K mart's apparel subsidiary, who spend a large amount of their time on the phone and have many of the store ID numbers memorized. The dialing plan allows those employees to avoid searching for telephone numbers in directories or computer files.

K mart has invested between $600 million and $700 million in technology for its stores, Carlson said. Part of that investment has gone to a very small aperture terminal satellite network used to handle credit card and check authorizations.

The company will carry about 70% of its data traffic on the VSAT system by Feb. 1, 1990. The other 30% will be temporarily carried on MCI's Vnet, but by 1991, virtually all of K mart's data traffic will be on the VSAT system, Carlson said.

U.K., Europe may establish groups

continued from page 4

Konig said a European group would probably cooperate with the NIU Forum. "That would be a natural side effect of such activity," he said.

If users express enough interest, an initial meeting could take place as early as January, and a group could begin taking shape in two or three months, Konig said.

The organization proposed by DTI for the U.K. would also be user-led but probably would include vendors. DTI has discussed the formation of the group and will approach potential participants to assess their interest, according to Alwyn Thomas, who works in the technical affairs branch of DTI's Telecommunications and Posts Division.

The purpose of the group, Thomas said, would be to close the gap between users and vendors, giving users the ability to identify business requirements and allowing vendors to translate those requirements into applications.

If the DTI proposal bears fruit, a relationship with the NIU Forum would be viable, he added.

"Clearly, in certain marketplaces like finance and manufacturing, providing consistent service between the two continents is the key to moving the market forward," according to Ron Aitchison, director of ISDN sales and marketing for ICL North America and chairman of the NIU Forum's applications, demonstration and testing work group.

Jim Kendrick, chairman of the NIU Forum's ISDN Users' Workshop, applauded the focus on users. "What they're trying to do is identify key users and user environments that can establish a true users group," he said. "It can't be led by the implementing and vendor community, just like ours is not led by that."

Centrex users want service

continued from page 3

subpar service and support, and slow and limited rollout of new features as primary concerns.

The percent of satisfied users has slipped over the last year, with 54% totally or partially satisfied, and roughly 17% indicating they are totally or partially displeased, according to the 1989 survey. Almost one-third of the respondents were undecided.

In 1988, 59% said they were totally or somewhat satisfied with their telephone company's Centrex efforts, with the remainder either undecided or dissatisfied (see chart, page 3).

"I'm not surprised that many key issues have gone unaddressed over the last year. That's why we're kicking off our conference with a session in which users voice their concerns directly to an RBHC panel," said NCUG President Richard Jenifer, a telecommunications specialist with CNA Insurance Companies of Chicago.

The survey asked members, for the first time, to rate the flexibility of their telephone companies' Centrex tariffs. The survey defined Centrex flexibility as the Centrex provider's ability to offer a multitude of ISDN features and provide agreeable terms.

Nineteen percent of the respondents rated them as flexible, 47% called them somewhat flexible, and the remainder tabbed them somewhat inflexible or totally inflexible.

Centrex users have long complained that service providers tariff a short list of available features they think users want and rely on special assembly tariffs — a process that sometimes takes several months — for users that want features not on the list.

"The RBHCs decide which new features will be offered, and those aren't necessarily the ones users are really interested in," Jenifer said. "Users want more say in which features the RBHCs tariff."

Users' pleas for more say about feature availability have been heard by some telephone companies, said Susan Rueppel, telecommunications manager for the California Trucking Association in Sacramento, Calif., an NCUG member company.

"In the last year, Pacific Bell has been much more responsive to user needs. They solicit customer input along the way instead of waiting until after the products and services are developed and hoping they fit our needs," Rueppel said. But the RBHCs still take too long to tariff new features, she added.

In addition to showing user concerns about feature tariffing, the survey revealed mounting customer dissatisfaction with older call distribution systems.

More than one-third of the respondents use central office-based uniform call distributor (UCD) or automatic call distributor (ACD) features.

Of that percentage, 74% use UCDs, 20% use ACDs and 6% use both. Call distribution systems are used primarily in order processing, telemarketing and customer service applications.

This year, 11% of ACD and UCD users gave the devices an excellent rating, 39% said they were good and 50% rated them fair, poor or bad.

In 1988, 62% of respondents called the effectiveness of their call distribution systems excellent or good, while 38% rated them fair, poor or bad.

Respondents say the erosion can be attributed in part to the fact that there are far more unhappy UCD users than there are happy ACD users.

Users prefer ACD features because they support more comprehensive personal computer-based management reporting packages, said Daniel Gonos, store system manager for Domino's Pizza, Inc. in Ann Arbor, Mich. "In our business, we have to have the ACD reports," Gonos said. "They measure agent productivity and help us decide when we need to reduce or increase the number of Centrex lines to meet calling volumes."

IBM bolsters software

continued from page 1

figure communications paths from NCP and VTAM to other networked devices.

Previously, Type 2.1 nodes, such as the Application System/400, could establish peer-to-peer communications across a backbone subarea network with other Type 2.1 nodes, but front-end processors and mainframes were considered Type 4 and 5 nodes, respectively. As such, they required complex network definitions to link to other devices.

Using casual connections, VTAM and NCP can emulate Type 2.1 nodes and establish Type 2.1 connections from VTAM-to-VTAM, from NCP-to-NCP or from VTAM-to-NCP.

Casual connections are not intended to replace Systems Network Architecture's standard subarea addressing schemes. Instead, they should make it easier to establish links with devices to which a user needs only occasional access, said Rick Hardison, an IBM VTAM senior planner.

Nodes defined as Type 2.1 can spontaneously dial up other Type 2.1 nodes, although users do not get the full redundancy that can be programmed into traditional SNA addressing schemes. Casual connections work over leased and switched lines, Hardison said, but must be initiated by the primary logical unit on the session.

Analysts said casual connections could be a useful feature.

"It's much easier to set up this new 2.1 connection between two NCPs than to do a permanent NCP-to-NCP subarea type connection," said Atul Kapoor, vice-president of the Haworth, N.J., consultancy Kaptronix, Inc. "It would be easier to administer in terms of system generation, and it can be a switched connection too, which is nice."

Also added in the new release of VTAM is a Session-Level LU to LU Verification feature that is used to compare the identity of one logical unit to another during activation of a logical unit-to-logical unit session. Users can employ the feature to ensure that no other programs interfere with the operation of distributed portions of an application.

The feature requires the use of a security program, such as IBM's Resource Access Control Facility (RACF), Hardison said.

ACF/VTAM Version 3 Release 3 is scheduled for general availability on Dec. 29 for MVS/ESA and MVS/XA, and in June for VM/SP and VM/9370. Graduated onetime charges for MVS versions range from $74,690 to $268,400 and from $4,815 to $89,840 for VM versions, depending on configuration. Graduated monthly charges for MVS versions range from $2,065 to $4,970 and from $619 to $1,815 for VM versions.

Besides offering its first NetView version to support MVS/ESA, IBM also added a new Program-to-Program feature that allows NetView to monitor problems within applications. For example, a user could program a file-transfer application to alert NetView if a file transfer goes uncompleted.

"Prior to this, there was no way a program could report an alarm to NetView," Kapoor said. "Today, the only place NetView can receive alarms from is VTAM. In effect, IBM has given us a hook into NetView whereby I can write programs, independent of VTAM, that send alarms to NetView."

With the feature, it's conceivable a user could write an application that accepts alarms from non-IBM devices and passes them to NetView, skirting the NetView/PC interface, Kapoor said.

The Program-to-Program feature is scheduled to be available Nov. 24 for MVS/XA. IBM has not announced when it will be available for VM. NetView Release 3 for MVS/ESA is scheduled to be available Dec. 1. A graduated onetime license ranges from $56,110 to $126,500, and a graduated monthly license ranges from $1,305 to $2,040.

IBM also enhanced support for Token-Ring Networks with its new release of NCP by allowing two TICs to have the same network address. That lets one TIC back up the other in case of failure and provides load balancing across TICs, bridges and Token-Rings configured as backbones.

Also added in the new release of VTAM is a Session-Level LU to LU Verification feature.

▲▲▲

The dual TIC addressing complements another new NCP feature, which supports automatic error recovery via an alternate path in the event that a logical connection with a device on a Token-Ring Network is severed.

ACF/NCP is scheduled for general availability Dec. 29 for MVS, in January for VM and in February for VSE. Prices vary widely depending on configuration and usage limits.

IBM also announced a new version of its X.25 NCP Packet Switching Interface (NPSI) software that will support data from Open Systems Interconnection-compatible devices via Integrated Services Digital Network Basic Rate Interface lines.

X.25 NPSI Version 3 Release 3 requires an IBM 7820 ISDN terminal adapter on each end of the link. The initial version supports a single switched 64K bit/sec circuit on an ISDN Basic Rate Interface link, although IBM is promising support for multiple switched circuits late next year.

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Number of servers attached: 1
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